ANL/EVS/AGEM/TR-07-13

Argonne NATIONAL LABORATORY

Final Report: Results of the 2007 Targeted Investigation at Hilton, Kansas

Environmental Science Division

USDA United States Department of Agriculture

Work sponsored by Commodity Credit Corporation, United States Department of Agriculture

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by
Applied Geosciences and Environmental Management Section
Environmental Science Division, Argonne National Laboratory

February 2008

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Notation

AGEM	Applied Geosciences and Environmental Management
AMSL	above mean sea level
BGL	below ground level
°C	degree(s) Celsius
CCC	Commodity Credit Corporation
CLP	Contract Laboratory Program
COC	chain of custody
CPT	cone penetrometer
DF	dilution factor
ECD	electron capture detection
ENVSYS	Envirosystems, Inc.
EPA	U.S. Environmental Protection Agency
ft	foot (feet)
g	gram(s)
gal	gallon(s)
GC	gas chromatograph
gpm	gallon(s) per minute
hr	hour(s)
in.	inch(es)
KDHE	Kansas Department of Health and Environment
µg/kg	microgram(s) per kilogram
µg/L	microgram(s) per liter
$\mu g/m^3$	microgram(s) per cubic meter
µS/cm	microsiemen(s) per centimeter
MCL	maximum contaminant level
mg/L	milligram(s) per liter
mi	mile(s)
min	minute
MS	mass spectrometer
NAD	North American Datum
NAVD	North American Vertical Datum
PAS	Pace Analytical Services, Inc.
pg	picogram(s)
ppb	part(s) per billion
PRP	potentially responsible party
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control

RBSL	risk-based screening level (Tier 2)
RPD	relative percent difference
SDG	sample delivery group
STL	Severn-Trent Laboratories
TOC	top of casing
USDA	U.S. Department of Agriculture
VOC	volatile organic compound

Final Report: Results of the 2007 Targeted Investigation at Hilton, Kansas

Executive Summary

The Commodity Credit Corporation (CCC), an agency of the U.S. Department of Agriculture (USDA), operated a grain storage facility in Hilton, Kansas, in 1954-1965. In 1992, carbon tetrachloride was first identified, at a concentration of 910 µg/L, in groundwater from well GW01 at Hilton. This discovery occurred in association with the sale of the private grain storage facility on which well GW01 is located to the current owner, the Mid-Kansas Cooperative Association.

The Kansas Department of Health and Environment conducted investigations at Hilton in 1992-1994. In 1996-1997, Argonne National Laboratory conducted Phase I and Phase II investigations on behalf of the CCC/USDA to characterize the distribution of the carbon tetrachloride contamination identified in well GW01, the stratigraphic units potentially hosting contaminant migration, and local hydrogeology in the Hilton area.

The 2007 targeted investigation reported here focused specifically on the former CCC/USDA property at Hilton, west of the railroad tracks. (Until a property record search in 2005, the location of the CCC/USDA's former facility at Hilton was not known with certainty.) The objectives of the investigation, as implemented, were to (1) investigate for carbon tetrachloride contamination in the shallower soil and shallow aquifer units below the former CCC/USDA property and (2) investigate groundwater flow patterns.

The key results of the 2007 targeted investigation are as follows:

- No carbon tetrachloride or chloroform contamination was found in soil or groundwater below the former CCC/USDA facility.

- The 2007 groundwater level data support a southwesterly direction for groundwater flow in the main Hilton aquifer (Equus Beds), consistent with findings of previous investigations. Contaminated well GW01 was confirmed to be upgradient from the former CCC/USDA facility.

- The contaminants carbon tetrachloride, chloroform, and 1,2-dibromoethane (ethylene dibromide) were found in groundwater *only* at well GW01. No evidence of contamination was found in other monitoring wells and piezometers. This pattern is consistent with findings of previous investigations.

The findings of the 2007 targeted investigation clearly demonstrate that the former CCC/USDA facility at Hilton was not the source of the carbon tetrachloride contamination persistently detected in well GW01. Well GW01 is approximately 300 ft upgradient from the former CCC/USDA facility. This well is the only sampling location at Hilton where carbon tetrachloride contamination in groundwater has ever been identified. The CCC/USDA never operated grain storage facilities on the property on which well GW01 is located.

1 Introduction

The Commodity Credit Corporation (CCC), an agency of the U.S. Department of Agriculture (USDA), operated a grain storage facility in Hilton, Kansas, in 1954-1965. At that time, grain storage facilities (CCC/USDA and private) were located along the both sides of the former Union Pacific railroad tracks (Figure 1.1). Grain storage structures operated subsequently by various commercial entities have been located primarily on or near the railroad right-of-way east of the tracks.

The Hilton site is located in central McPherson County, approximately 4 mi north of the city of McPherson (Figure 1.1). The area surrounding Hilton is relatively flat and sparsely populated and is used mainly for agriculture. The population within a 1-mi radius of the Hilton site is estimated at approximately 20. No formal community or political infrastructure is in place.

In 1992, carbon tetrachloride, a major component of a grain fumigant commonly used until 1985, was first identified at Hilton in association with the sale of the private grain storage facility *east* of the railroad tracks by Wall-Rogalsky to the current owner, Mid-Kansas Cooperative Association. Sampling of groundwater from well GW01 — *east* of the tracks — indicated an elevated carbon tetrachloride concentration of 910 μg/L. Subsequent investigations led by the Kansas Department of Health and Environment (KDHE 1993, 1994) suggested that the contamination in GW01 could be linked to the former operation at the CCC/USDA grain storage facility.

In 1996-1997, the Environmental Research Division of Argonne National Laboratory conducted Phase I and Phase II investigations at Hilton on behalf of the CCC/USDA (Argonne 1997a,b). The purpose was to characterize the distribution of the carbon tetrachloride contamination, the stratigraphic units hosting contaminant migration, and local hydrogeology. This work focused on the area *east* of the railroad tracks. (Until a property record search in 2005, the location of the CCC/USDA's former facility at Hilton was not known with certainty.)

In 2007, Argonne's Environmental Science Division conducted a targeted investigation at Hilton on behalf of the CCC/USDA. This investigation focused primarily on the area *west* of the railroad tracks, where the CCC/USDA is now known to have operated its grain storage facility. The 2007 targeted investigation was designed to supplement the 1996-1997 Phase I and Phase II investigations. The objectives of the 2007 work were to determine whether carbon tetrachloride

is present in soil and groundwater at the former CCC/USDA facility *west* of the railroad tracks as a potential contaminant source to groundwater, and then to delineate the extent of any contamination found. This report presents the findings of the 2007 targeted investigation.

1.1 Background and Previous Investigations

After the 1992 discovery of contamination in well GW01, additional KDHE investigations began. The results of the KDHE investigations (KDHE 1993, 1994) and Argonne's previous investigations (Argonne 1997a,b) are summarized in Figures 1.2 and 1.3. These results were presented in greater detail in the *Work Plan* (Appendix A in Argonne 2007). Carbon tetrachloride has been identified consistently in well GW01. The highest concentration, 1,630 µg/L, occurred in August 1994 (along with chloroform at 46.8 µg/L and 1,2-dibromoethane (ethylene dibromide) at 7.2 µg/L; KDHE 1994). These contaminants have not been found in any other wells sampled (Figure 1.2). Carbon tetrachloride was found in shallow soil samples collected *east* of the railroad tracks Figure 1.3).

In 2005, Argonne conducted a property records search for the CCC/USDA to identify extent of the former grain storage facilities, operational history, and ownerships. The results are documented in Appendix B of the *Work Plan* (Argonne 2007). The principal combined findings of the previous investigations and the property records search are as follows:

- Geologic and hydrologic setting

    - The shallow geologic section at Hilton consists of Middle Pleistocene age fluvial and overbank sediments of the McPherson Formation, deposited along the eastern flank of the McPherson paleochannel and overlying Middle Permian shale of the Wellington Formation (Figure 1.4). The overbank deposits are mainly calcareous silty clays and clays that overlie the sands of the fluvial facies, which are part of the Equus Beds aquifer (a part of the regional High Plains aquifer). This main Hilton aquifer unit (Equus Beds) is present at SB01 and SB07 (in the vicinity of the former private grain storage facilities *east* of the railroad) but is absent at SB06 (about 1,200 ft *west* of the railroad; Figure 1.5).

- An upward-fining sequence of coarse-grained sand to fine- to very fine-grained sand occurs in thin lenses, in a predominantly silty to sandy clay matrix. This sequence forms the *shallow aquifer unit* at the Hilton site. This sand unit is present in the upper portion of the McPherson Formation at SB06, but it pinches out eastward and southward and is absent at SB01 and SB07 (Figure 1.5). The monitoring well at location SB06 is screened in the shallow aquifer unit.

- The main Hilton aquifer unit (Equus Beds) may be locally confined or semiconfined in the vicinity of Hilton. The sands of this aquifer thin from a thickness approaching 250 ft (EBIR 2007) in the main (McPherson) paleochannel approximately 30 mi southwest of Hilton to slightly over 14 ft locally. The wells completed at or near Hilton in the less developed, thinner sands of the Equus Beds aquifer (at the edge of the McPherson paleochannel) are reported to produce significantly less water (2-15 gpm) than wells to the west and southwest, developed in thicker sections of the McPherson paleochannel where the sequence is dominated by coarse sand and gravel. Irrigation wells developed in this coarser-grained section are reported to produce water at rates in excess of 1,000 gpm.

- The mean potentiometric surface, based on January 1997 regional water level data (KGS 1997), declines from an elevation of 1,548 ft above mean sea level (AMSL) at the eastern edge of McPherson County to 1,400 ft AMSL in the McPherson paleochannel at the western edge of the county. However, the January 1997 water levels in the vicinity of Hilton were between 1,438 ft and 1,440 ft AMSL, with a groundwater flow bearing of S6°W.

• Soil and groundwater contamination

- Carbon tetrachloride and chloroform have been found persistently in well GW01. However, no contamination has been found in other wells sampled in the Hilton vicinity (Figure 1.2).

- The results of vegetation and soil sampling — outside the railroad property and surrounding private land to which access was denied — indicated the presence of low concentrations of carbon tetrachloride in a defined area on the eastern edge of the former private grain storage facilities *east* of the railroad tracks and south of Pathfinder Lane (Figure 1.3).

- The source of the contamination in well GW01 cannot be determined without access to the property on which the well is located. Nevertheless, in the absence of additional information, the contaminant source can most reasonably be assumed to be near well GW01. Though the exact nature and length of the gravel pack used in the well's construction are unknown, the possibility remains that well GW01 provided a conduit for contaminant migration from vadose zone soil or shallower saturated silts and clays to the aquifer sands in the screened interval.

• Former grain storage facilities as potential source areas

- Former grain storage facilities were identified in three areas at Hilton: western area, northeastern area, and southeastern area (Figures 1.6 and 1.7).

- The former CCC/USDA facility, located in the *western area*, west of the railroad right-of-way and north of Pathfinder Lane, was operated on the property leased to the CCC/USDA in 1954-1965. The facility consisted of 30 grain storage bins on a strip of land 128 ft × 510 ft. The property is currently owned by Foster Farms, a Kansas partnership.

- In the *northeastern area*, east of the railroad tracks and north of Pathfinder Lane, the grain storage facility was operated on the former Union Pacific Railroad right-of-way. In the 1960s, the facility consisted of 1 grain elevator, 1 storage shed and shop, 2 bins (20 ft in diameter), 9 silos, and contaminated well GW01 (south of the storage shed and shop). Grain storage continues in this area at a smaller scale. The current operator is the

Mid-Kansas Co-op. The CCC/USDA never operated grain storage facilities on this property in the northeastern area.

- In the *southeastern area*, east of the railroad tracks and south of Pathfinder Lane, the grain storage facility was operated on the Union Pacific Railroad right-of-way and the adjacent privately owned property. Operated by McPherson Grain Company and Wall-Rogalsky Milling Company from 1959 to 1992, the facility reached its largest scale in the 1960s, with 1 elevator, 5 small bins (20 ft in diameter), 6 silos, and 39 large bins (25 ft in diameter). Grain storage continues in this area at a smaller scale. The current operator is the Mid-Kansas Co-op. The CCC/USDA never operated grain storage facilities on this property in the southeastern area.

1.2 Objectives of the Targeted Investigation

In view of the results of its Phase I and Phase II investigations (Argonne 1997a,b) and the 2005 property records search, the 2007 targeted investigation was designed to generate technical information specifically related to the former CCC/USDA property (*west* of the former railroad). The specific technical objectives of the targeted investigation, as presented in the approved *Work Plan* (Argonne 2007), were as follows:

- Investigate for carbon tetrachloride contamination in soil and groundwater on the former CCC/USDA property (*west* of the former railroad).

- If contamination was found in soil and groundwater on the former CCC/USDA property, determine the groundwater flow direction, and identify whether a soil source of carbon tetrachloride and a soil-to-groundwater migration pathway exist on the property.

- If a contaminant source was found on the former CCC/USDA property, determine the lateral and vertical extent of the carbon tetrachloride plume emanating from the property.

- If the former CCC/USDA facility was identified as a contaminant source, establish a groundwater monitoring network.

To accomplish these objectives, implementation of the investigation was proposed in four successive segments. At the end of each segment, the CCC/USDA and KDHE project managers were to be informed of all results, so that they could evaluate (1) the need to progress to the next segment of the investigation and (2) the alterations to the existing work plan potentially required as a consequence of the initial results. The investigation work plan was approved by the KDHE in May of 2007 (KDHE 2007).

1.3 Organization of This Report

The remainder of this report documents the findings of the targeted investigation at the former CCC/USDA facility (*western* facility at Hilton). Section 2 describes the investigative methods used during the targeted investigation. Section 3 presents the results. Section 4 discusses and interprets the results in the context of the specific technical objectives outlined in Section 1.2. Section 5 summarizes the findings of the investigation and presents conclusions.

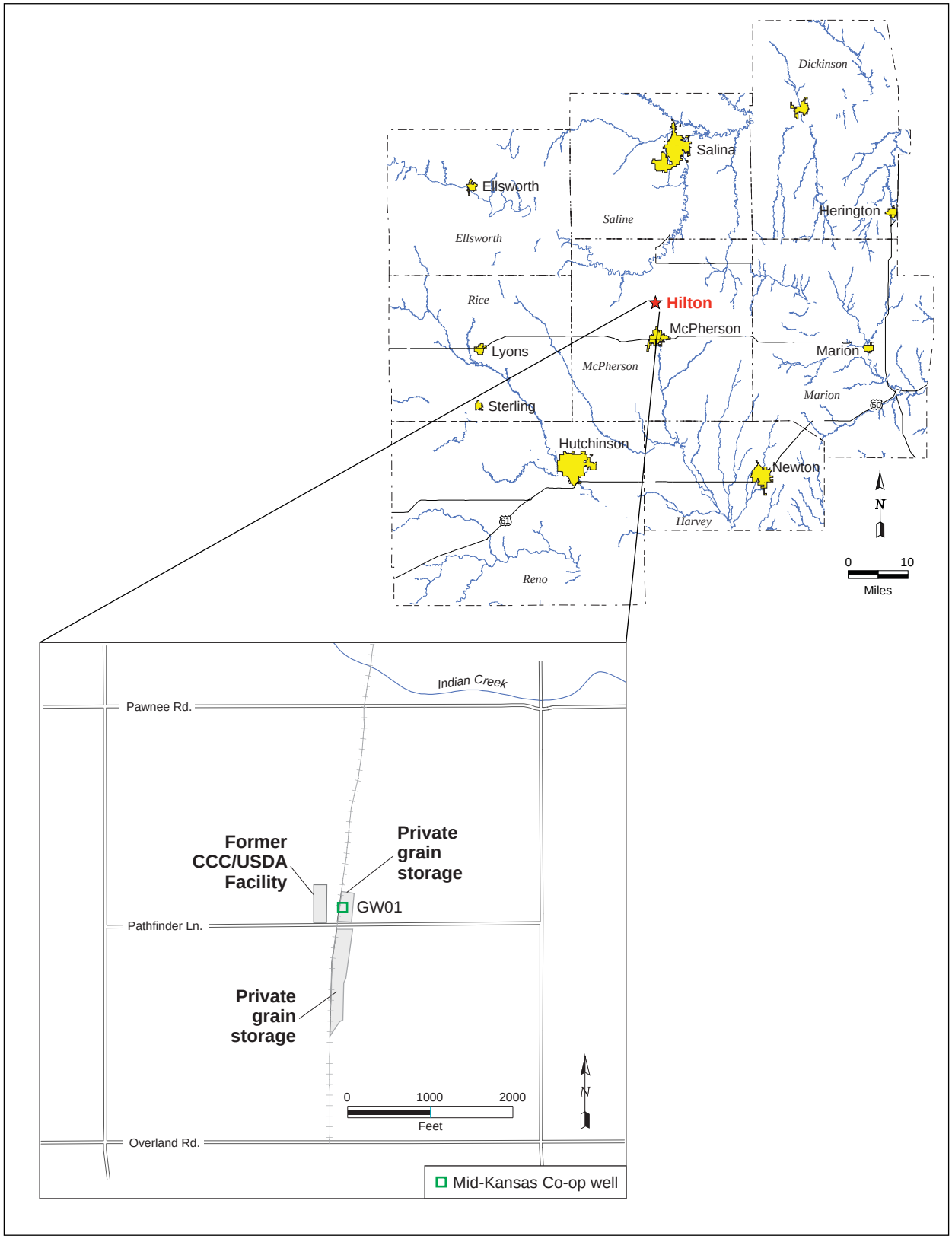

FIGURE 1.1 Locations of Hilton, Kansas, the former CCC/USDA and private grain storage facilities, and contaminated well GW01.

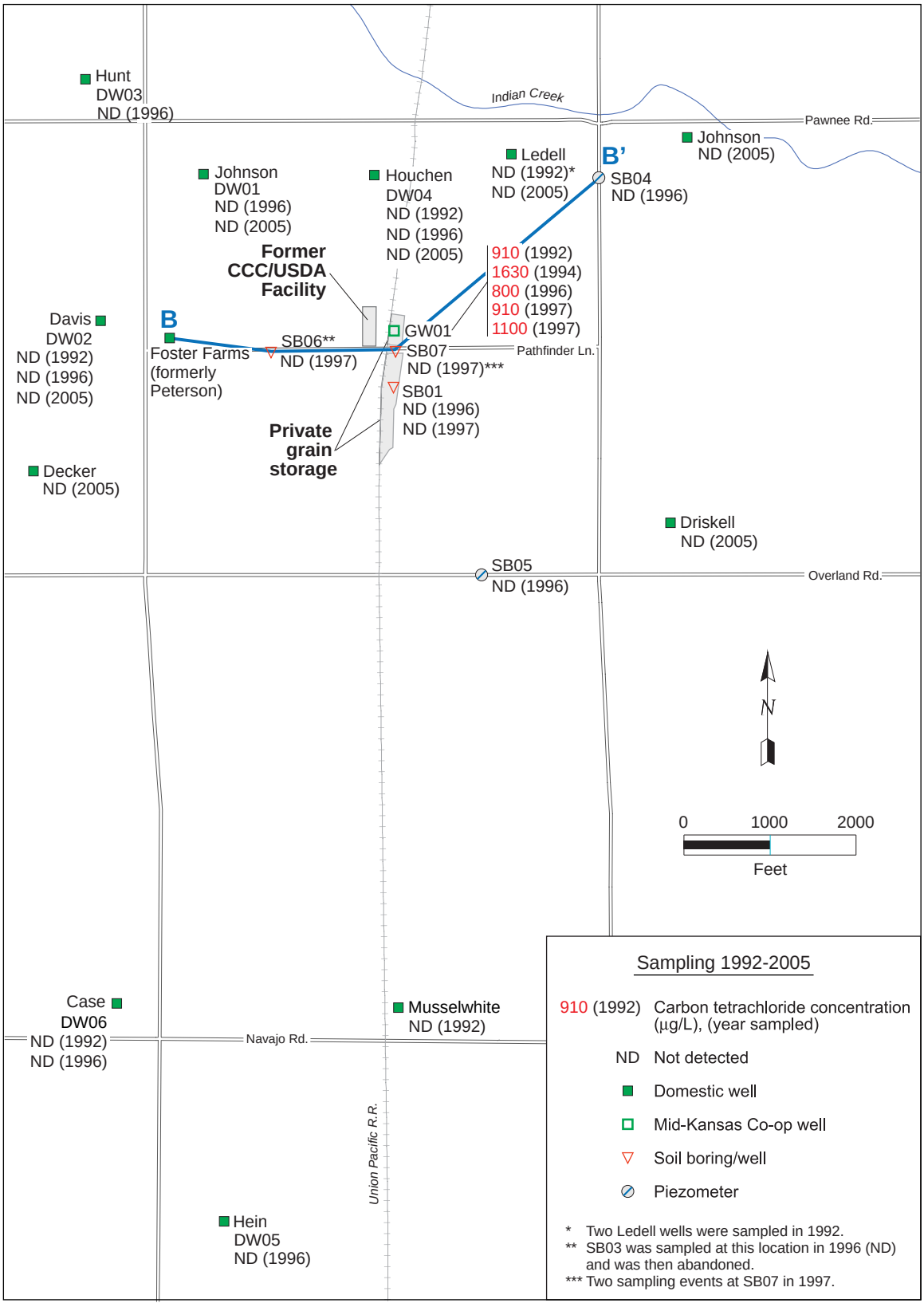

FIGURE 1.2 Historical results of carbon tetrachloride analyses on groundwater samples collected in the Hilton area, 1992-2005.

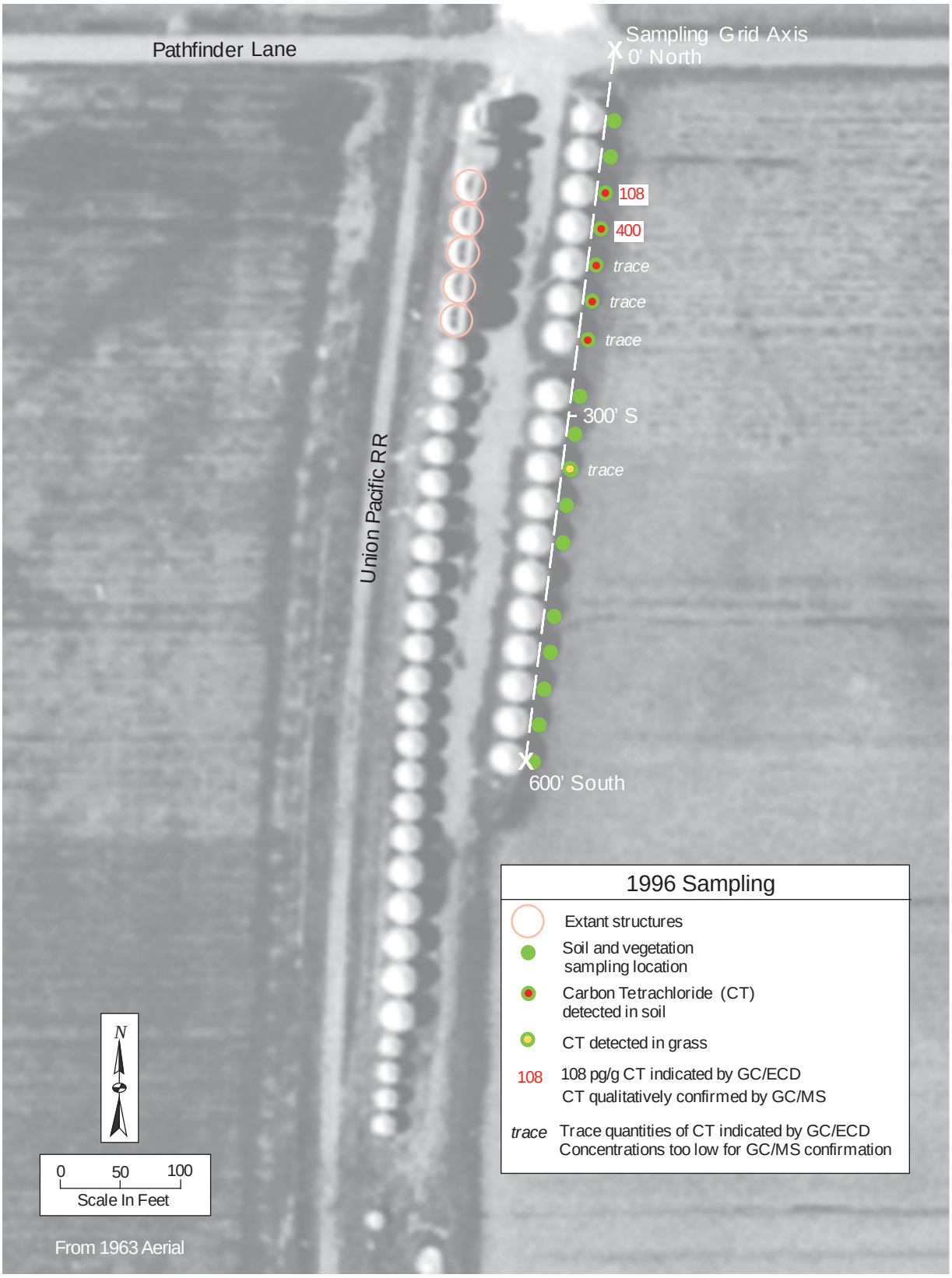

FIGURE 1.3 Soil and vegetation sampling locations in 1996, with analytical results for carbon tetrachloride, shown on a 1963 aerial photograph. Source of photograph: ASCS (1963).

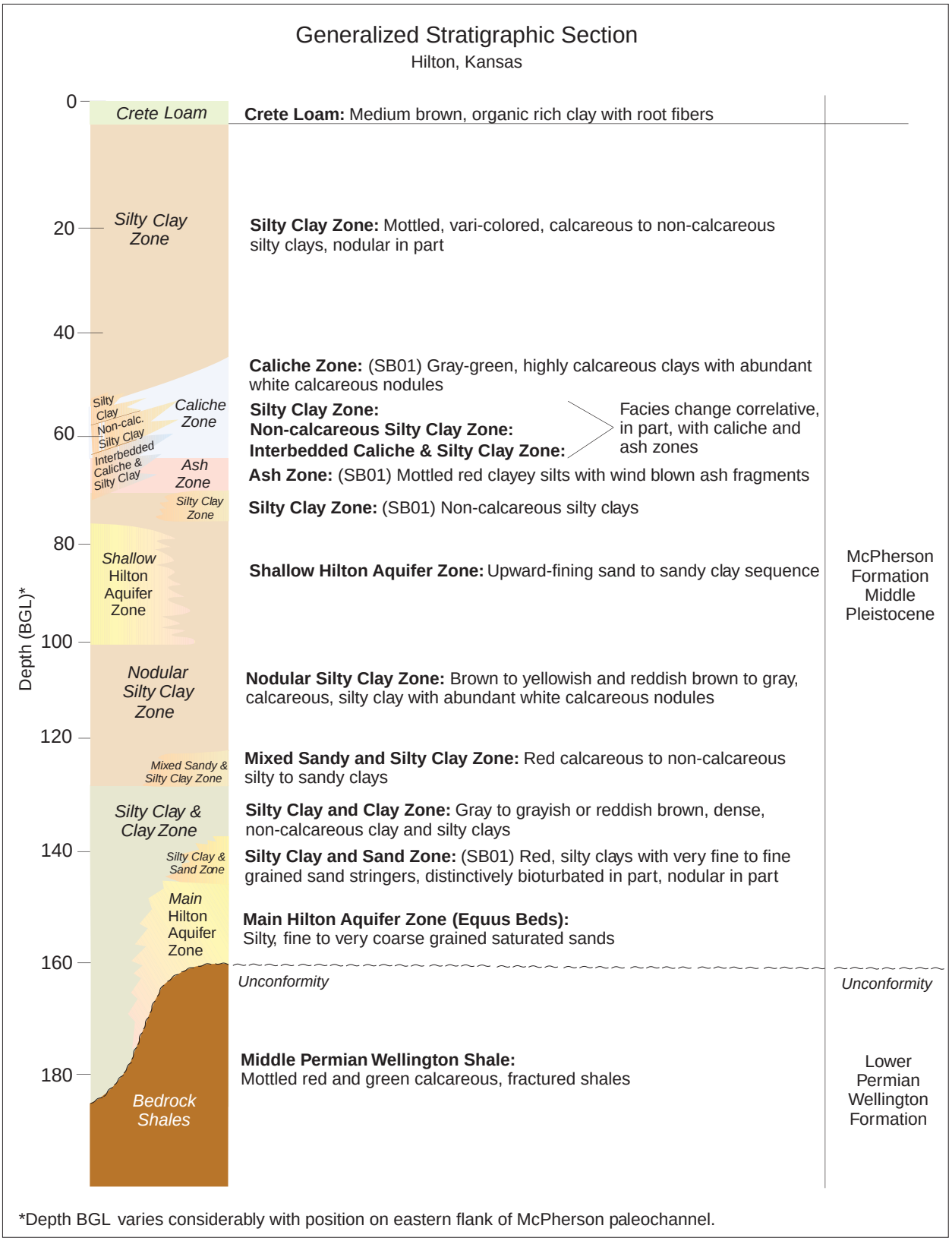

FIGURE 1.4 Simplified stratigraphic section derived from core descriptions for SB01, SB06, and SB07 at Hilton.

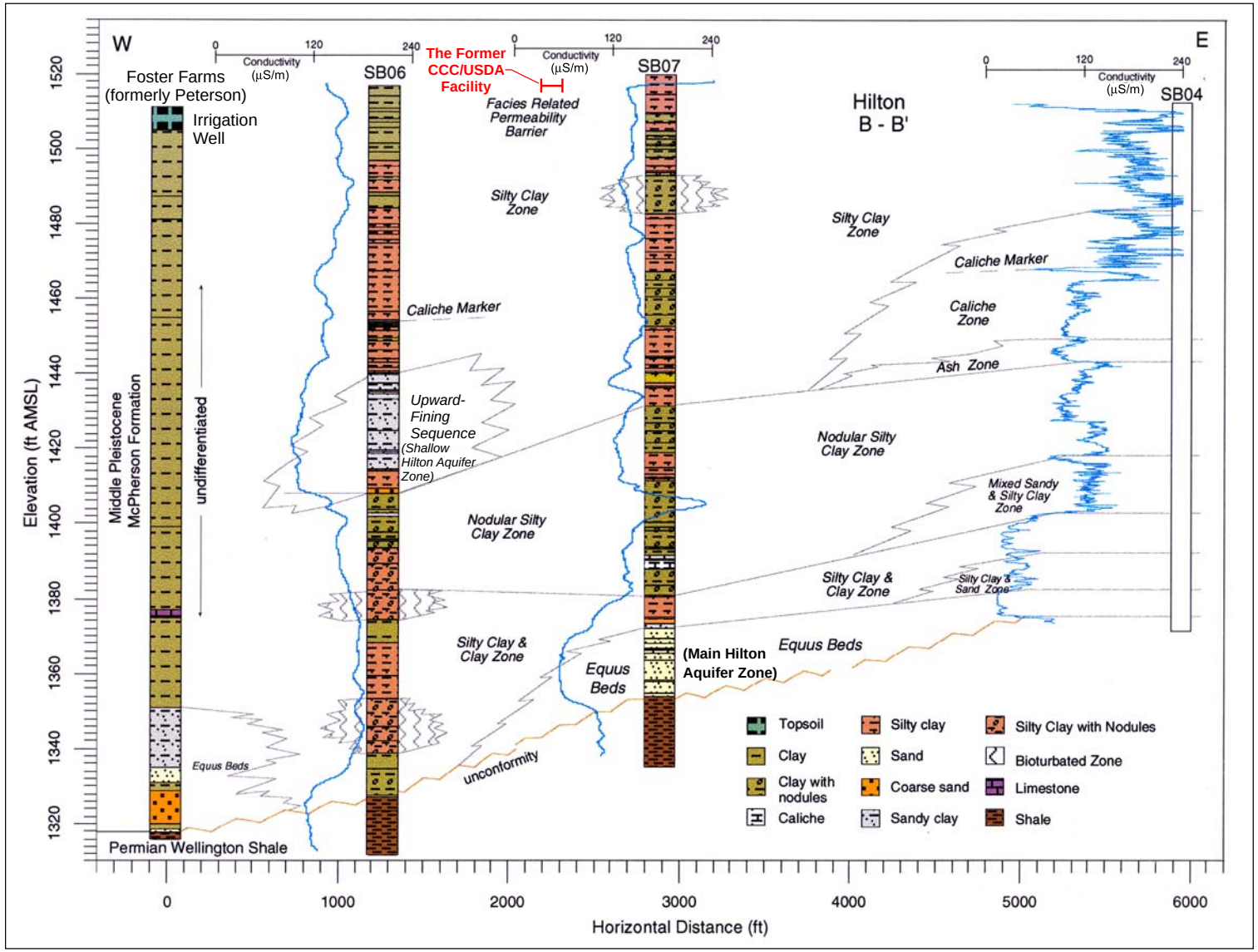

FIGURE 1.5 West-to-east geologic cross section B–B′ (vertically exaggerated), illustrating the stratigrtaphic relationships in the vicinity of the former CCC/USDA and private grain storage facilities at Hilton. Location is shown in Figure 1.2.

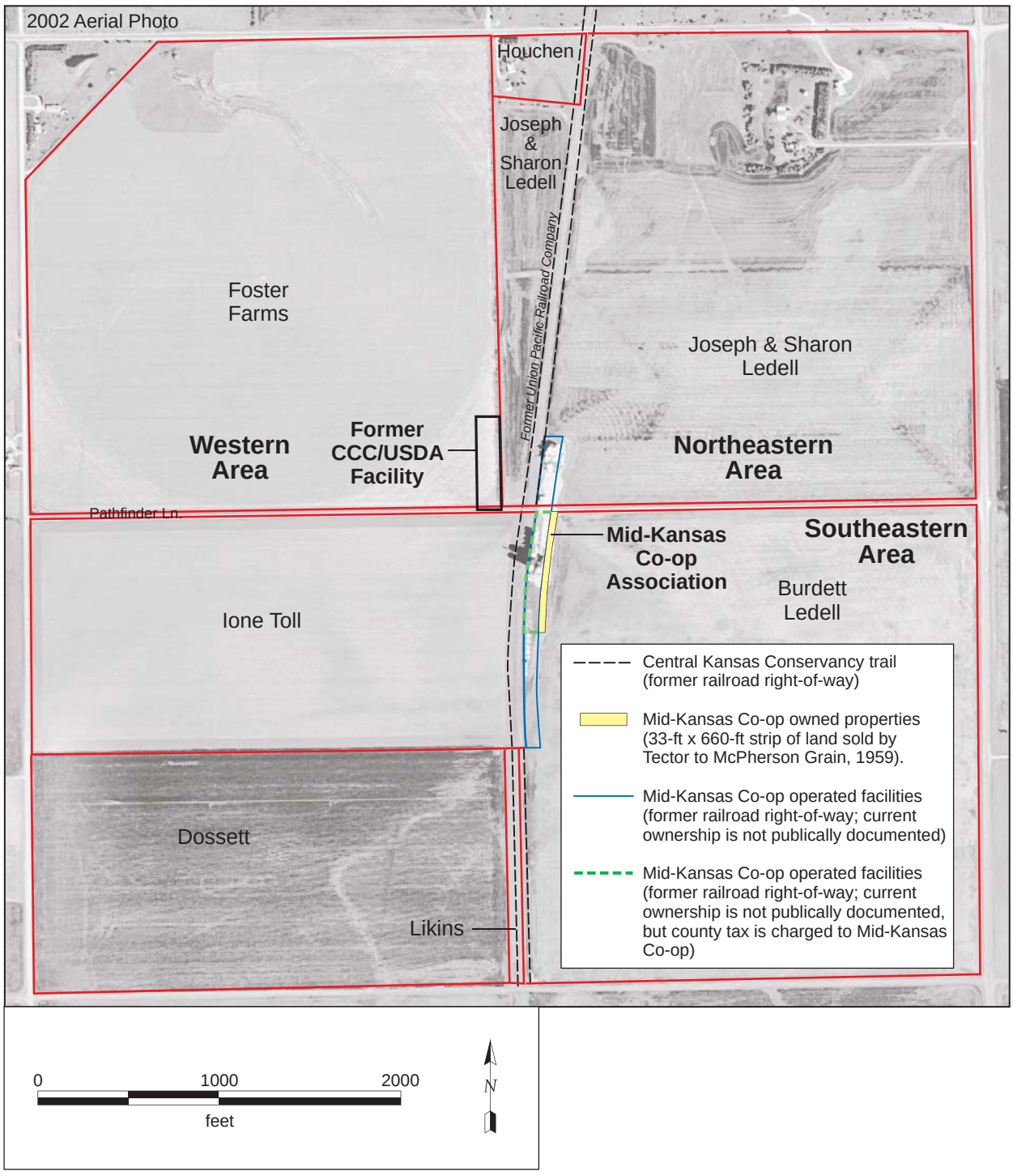

FIGURE 1.6 Locations of current property boundaries, the former CCC/USDA facility, the present Mid-Kansas Co-op, and the former Union Pacific Railroad Company property at Hilton. The former railroad property is now owned in part by the Central Kansas Conservancy and occupied in part by the Mid-Kansas Co-op facilities. Source of photograph: NAIP (2002).

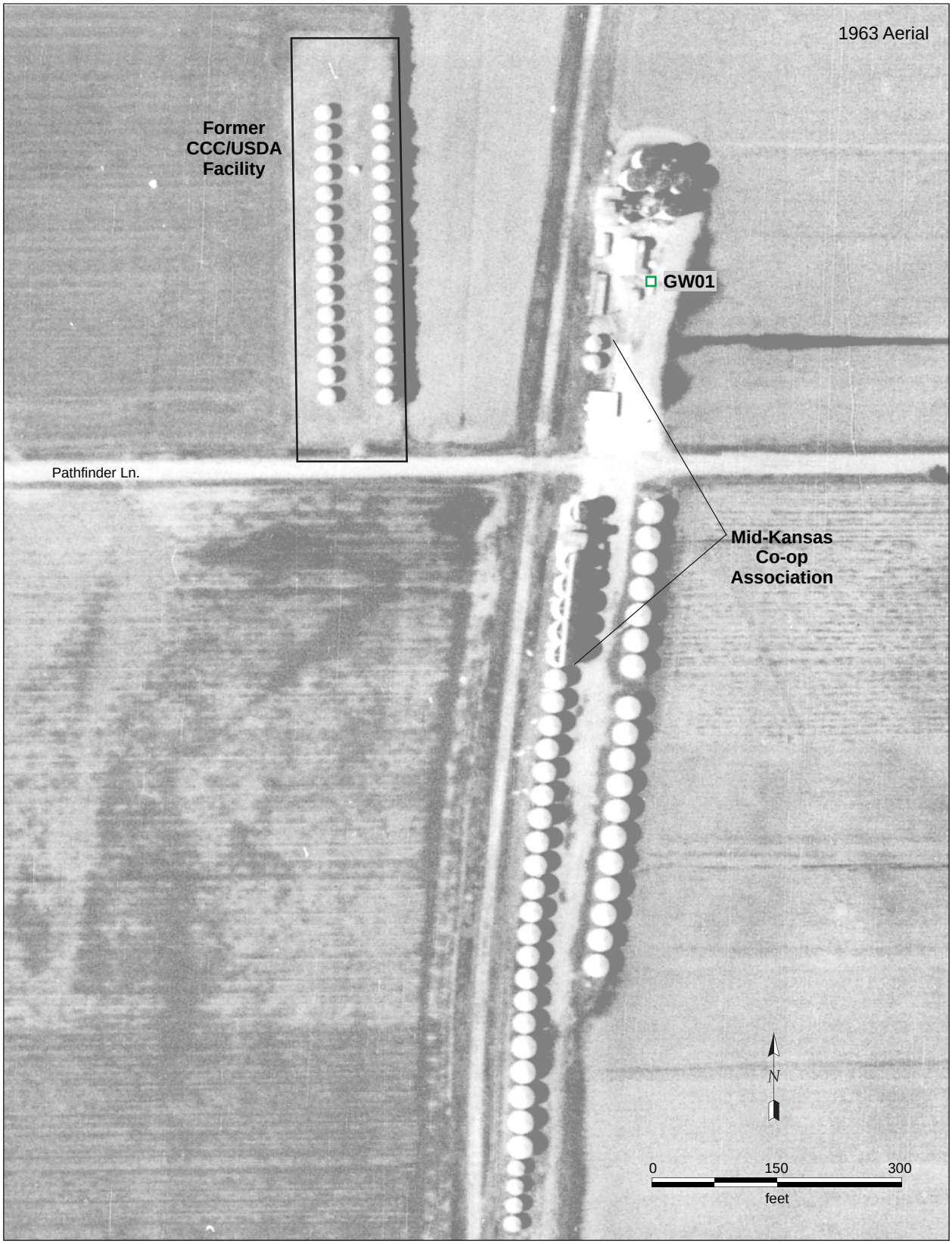

FIGURE 1.7 Grain storage facilities at Hilton in 1963. Source of photograph: ASCS (1963).

2 Investigative Methods

The targeted investigation at Hilton was performed in successive segments, as proposed in the *Work Plan* (Argonne 2007). To ensure that the specific technical objectives listed in Section 1.2 were achieved effectively, data acquired were interpreted and evaluated at the end of each segment. The recommended tasks for subsequent segments were revised to reflect the improved understanding of the site. The CCC/USDA and KDHE project managers were kept informed of all findings as the field investigation processed, and changes to the *Work Plan* were made with their input and approval. Two primary modifications were made, as follows:

- As proposed in the *Work Plan* (Argonne 2007), the objective in Segment 1 was to identify carbon tetrachloride contamination in shallower soil and shallow aquifer units at three locations *west* of the former railroad, TI01-TI03 (Figure 2.1). The analytical results consistently indicated the absence of carbon tetrachloride below the former CCC/USDA facility (Section 4). Upon reviewing these results, the KDHE and CCC/USDA managers determined that the further data acquisition and investigation activities proposed for the subsequent segments were unnecessary, with the exception below.

- At the request of the KDHE, water level data were collected for all identified aquifer units at the three new cone penetrometer (CPT) investigation locations (TI01-TI03) on the former CCC/USDA facility and at the existing monitoring points (SB01, SB04, SB06, and SB07) shown in Figure 2.1. Groundwater flow patterns were analyzed on the basis of the available water level data (Section 4). This activity was proposed in the *Work Plan* (Argonne 2007) as part of Segment 2.

This section focuses on the methods used to implement the targeted investigation and to achieve the specific technical objectives proposed for Segment 1 and part of Segment 2, as described above. All detailed methods and procedures for the individual techniques were employed as specified in the targeted investigation *Work Plan* (Argonne 2007) and the *Master Work Plan* (Argonne 2002) and are not repeated here. A comprehensive quality assurance/quality control (QA/QC) program was implemented to confirm the reliability of all information as it was accumulated. The results of implementation of the QA/QC program are discussed in Section 3.

2.1 Methods to Investigate for Carbon Tetrachloride Contamination in Soil and Groundwater on the Former CCC/USDA Property (*West* of the Former Railroad Tracks)

The targeted investigation field activities focused on the former CCC/USDA facility (Figure 2.2), as proposed for Segment 1 (Argonne 2007). Vertical profiling was conducted at the three CPT investigation locations (TI01-TI03) shown in Figure 2.2. To ensure that all soil sources and soil-to-groundwater pathways were identified, the following strategies were emphasized:

- Identification of shallow aquifer units was attempted through analysis of electronic CPT data for tip stress, sleeve stress, and conductance. The electronic data were compared with lithology logs obtained during continuous soil sampling at TI01, from near the ground surface to the depth of the refusal. This analysis identified multiple potentially water-bearing units. The distinguishing electronic characteristics of these units became a guide in analyzing electronic data acquired subsequently at CPT locations TI02 and TI03.

- All potential shallow aquifer units were confirmed through the collection of groundwater samples. At the request of the KDHE, the analyses of these groundwater samples for volatile organic compounds (VOCs) specifically included 1,2-dibromoethane (ethylene dibromide) as a target analyte. (This compound has been detected in groundwater at well GW01 but not at other sampling locations, and therefore the analysis would have helped to distinguish multiple sources of carbon tetrachloride.) At each CPT location, three or four attempts were made to collect groundwater samples at different depths in the units identified as potentially water bearing. If no water was produced immediately from these units, temporary piezometers of polyvinyl chloride (PVC) casing were set with the CPT unit, and groundwater sampling was attempted within 24 hr. Analytical results for groundwater samples collected from the shallow aquifer units provided a firm basis for identifying carbon tetrachloride contamination in the shallow groundwater below the former CCC/USDA property.

- Continuous soil profiling with sampling for VOCs analyses (including 1,2-dibromoethane [ethylene dibromide]) was conducted through the vadose zone and to the depth of the uppermost shallow aquifer unit identified beneath the former CCC/USDA facility. The analytical results were evaluated to determine whether carbon tetrachloride was present in soil as a potential contaminant source.

2.2 Methods to Determine Groundwater Flow Patterns

Accurate determination of groundwater flow patterns was accomplished through a systematic three-step analysis: (1) identification of hydrostratigraphic units such as perched aquifers, aquifers, and confining layers; (2) measurement of water levels for each identified aquifer or perched aquifer; and (3) analysis of data to determine the hydraulic relationships among aquifers and flow direction(s) within an aquifer.

The methods discussed in Section 2.1 were used to identify all shallow water-bearing units at the three CPT investigation locations (TI01-TI03). At each CPT location, a temporary piezometer was installed with a filter screen exclusively targeting each water-bearing unit found. Water levels were measured in all temporary piezometers at the end of the field program to generate a data set for the perched aquifers below the former CCC/USDA facility. Water levels for the shallow aquifer at SB06 and for the Hilton main aquifer (Equus Beds) at SB01, SB04, and SB07 were also measured during the field investigation. The hydrostratigraphic characteristics of the units and the water level data were analyzed to determine hydraulic relationships and flow patterns for the aquifers, to the extent supported by the data.

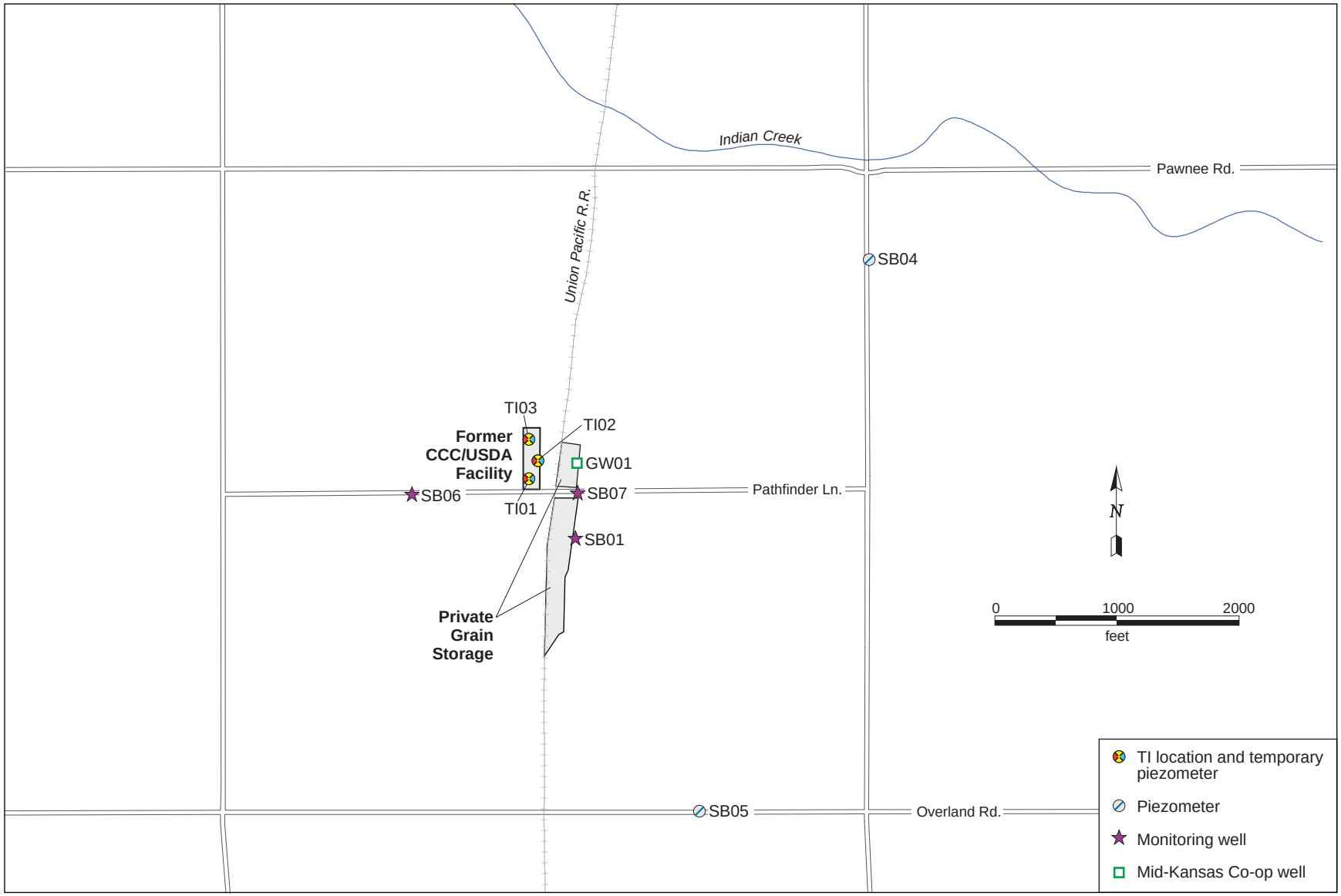

FIGURE 2.1 Locations of field activities in the 2007 targeted investigation at Hilton.

FIGURE 2.2 Sampling locations on the former CCC/USDA property in the 2007 targeted investigation at Hilton. Source of photograph: ASCS (1963).

3 Field and Laboratory Data

The data generated by the targeted investigation are presented in this section by the type of test performed or the medium analyzed. The methodologies for collecting these data are discussed in the Section 2. Detailed procedures were described in the targeted investigation *Work Plan* (Argonne 2007) and the *Master Work Plan* (Argonne 2002). A detailed interpretation of these data is in Section 4.

3.1 Electronic Cone Penetrometer Sensor Data

Electronic data for tip stress, sleeve stress, and conductance were collected by CPT sensors at all investigation locations (TI01-TI03) on the former CCC/USDA facility (Figure 2.2). The sensor logs were used as a guide for the general identification of major stratigraphic units, possible water-bearing zones, and optimal intervals for confirmatory soil and groundwater sampling. These electronic logs are in Appendix A.

3.2 Soil Sampling Data

At the first investigation location (TI01), continuous vertical-profile soil samples were collected from near the ground surface to 88 ft below ground level (BGL). Confirmatory soil samples for lithologic logging were collected at 92-96 ft BGL and 100-104 ft BGL to establish a general correlation between the CPT sensor data and identified lithologic units. The detailed lithologic descriptions are in Appendix A.

At TI01, TI02, and TI03, soil samples for VOCs analyses (including 1,2-dibromoethane [ethylene dibromide]) were collected at 4-ft intervals from near the ground surface to 40-50 ft BGL, the approximate depth of the top of the uppermost aquifer unit identified on the former CCC/USDA property. Descriptions of the soil samples collected for VOCs analyses are in Appendix B, Table B.1.

Soil samples collected in or below the uppermost aquifer units (42-82 ft BGL) at TI01 had been analyzed for VOCs before the aquifer unit was confirmed. Descriptions of these samples are in Appendix B, Table B.1.

All soil samples were analyzed at the Applied Geosciences and Environmental Management (AGEM) Laboratory at Argonne according to a modification of U.S. Environmental Protection Agency (EPA) Method 8260B (purge-and-trap method), as referenced in the EPA's SW-846 (EPA 2004), to achieve a quantitation limit of 10 µg/kg. This method involves methanol extraction and analysis on a gas chromatograph-mass spectrometer system. The results are in Table 3.1. Replicate soil samples collected for verification analysis are discussed in Section 3.7.

3.3 Groundwater Sampling Data

Groundwater samples were collected from the water-bearing units identified at boring locations TI01, TI02, and TI03, at depths to 130 ft BGL. All of the water-bearing units identified were thin (≤ 10 ft). One sample was collected for each of the water-bearing units at each CPT location. In two unsuccessful attempts (made at 52-57 ft BGL at location TI02 and at 43-48 ft BGL at location TI03), no water samples could be collected *above* the confirmed water-bearing units. In these intervals, no water was produced within 24 hr after temporary piezometers had been installed, though the intervals had been identified as potentially water bearing relative to the rest of silty clay matrix. An additional unsuccessful attempt was made to sample water from the zone (105.9-110.9 ft BGL) *below* the deepest water-bearing unit at TI01. Water was similarly not produced from this zone at TI01. Descriptions of the groundwater samples collected are in Appendix B, Table B.1.

Groundwater samples were also collected from existing monitoring points SB01, SB04, SB06, and SB07 and from Mid-Kansas Co-op well GW01 (Figure 2.1). Previously installed piezometer SB05 was found to have been damaged. The concrete surface housing was detached from the well, and the well casing could not be located. Consequently, no groundwater sample was collected at SB05.

All groundwater samples were analyzed for VOCs (including 1,2-dibromoethane [ethylene dibromide]) at the AGEM Laboratory, according to a modification of EPA Method 524.2 (EPA 1995). The replicate groundwater samples collected for verification analysis with the EPA's Contract Laboratory Program (CLP) methodology are discussed in Section 3.7. The analytical results for groundwater samples are in Table 3.2.

TABLE 3.1 Organic analysis results from the AGEM Laboratory for vertical-profile soil sampling at Hilton, Kansas.

				Concentration (µg/kg)			
Location	Sample	Depth (ft BGL)	Sampling Date	Carbon Tetrachloride	Chloroform	Methylene Chloride	Ethylene Dibromide
TI01	HLTI01-S-23764	3.5	6/23/07	ND[a]	ND	ND	ND
TI01	HLTI01-S-23765	6	6/23/07	ND	ND	ND	ND
TI01	HLTI01-S-23766	10	6/23/07	ND	ND	ND	ND
TI01	HLTI01-S-23768	14	6/23/07	ND	ND	ND	ND
TI01	HLTI01-S-23769	18	6/23/07	ND	ND	ND	ND
TI01	HLTI01-S-23772	22	6/23/07	ND	ND	ND	ND
TI01	HLTI01-S-23773	26	6/23/07	ND	ND	ND	ND
TI01	HLTI01-S-23774	30	6/23/07	ND	ND	ND	ND
TI01	HLTI01-S-23775	34	6/23/07	ND	ND	ND	ND
TI01	HLTI01-S-23776	38	6/23/07	ND	ND	ND	ND
TI01	HLTI01-S-23777	39.5	6/23/07	ND	ND	ND	ND
TI01	HLTI01-S-23778	42	6/23/07	ND	ND	ND	ND
TI01	HLTI01-S-23779	46	6/23/07	ND	ND	ND	ND
TI01	HLTI01-S-23780	50	6/23/07	ND	ND	ND	ND
TI01	HLTI01-S-23781	54	6/23/07	ND	ND	ND	ND
TI01	HLTI01-S-23782	58	6/23/07	ND	ND	ND	ND
TI01	HLTI01-S-23783	62	6/23/07	ND	ND	ND	ND
TI01	HLTI01-S-23784	65.5	6/24/07	ND	ND	ND	ND
TI01	HLTI01-S-23785	70	6/24/07	ND	ND	ND	ND
TI01	HLTI01-S-23786	74	6/24/07	ND	ND	ND	ND
TI01	HLTI01-S-23787	76.5	6/24/07	ND	ND	ND	ND
TI01	HLTI01-S-23788	82	6/24/07	ND	ND	ND	ND
TI02	HLTI02-S-23811	2	6/26/07	ND	ND	ND	ND
TI02	HLTI02-S-23812	6	6/26/07	ND	ND	ND	ND
TI02	HLTI02-S-23813	10	6/26/07	ND	ND	ND	ND
TI02	HLTI02-S-23814	14	6/26/07	ND	ND	ND	ND
TI02	HLTI02-S-23815	18	6/26/07	ND	ND	ND	ND
TI02	HLTI02-S-23816	22	6/26/07	ND	ND	ND	ND
TI02	HLTI02-S-23817	26	6/26/07	ND	ND	ND	ND
TI02	HLTI02-S-23819	30	6/26/07	ND	ND	ND	ND
TI02	HLTI02-S-23820	34	6/26/07	ND	ND	ND	ND
TI02	HLTI02-S-23821	38	6/26/07	ND	ND	ND	ND
TI03	HLTI03-S-23799	2	6/25/07	ND	ND	ND	ND
TI03	HLTI03-S-23800	6	6/25/07	ND	ND	ND	ND
TI03	HLTI03-S-23801	10	6/25/07	ND	ND	ND	ND
TI03	HLTI03-S-23802	14	6/25/07	ND	ND	ND	ND
TI03	HLTI03-S-23803	18	6/25/07	ND	ND	ND	ND
TI03	HLTI03-S-23804	22	6/25/07	ND	ND	ND	ND
TI03	HLTI03-S-23805	26	6/25/07	ND	ND	ND	ND
TI03	HLTI03-S-23806	30	6/25/07	ND	ND	ND	ND
TI03	HLTI03-S-23807	34	6/25/07	ND	ND	ND	ND
TI03	HLTI03-S-23808	38	6/25/07	ND	ND	ND	ND
TI03	HLTI03-S-23809	42	6/26/07	ND	ND	ND	ND
TI03	HLTI03-S-23810	46	6/26/07	ND	ND	ND	ND

[a] ND, contaminant not detected at the instrument detection limit of 1.0 µg/kg for the purge-and-trap method.

TABLE 3.2 Organic analysis results from the AGEM Laboratory for groundwater sampling at Hilton, Kansas, with field measurements.

					Concentration (µg/L)						
Location	Sample	Depth (ft BGL)	Sampling Date	Sample Type[a]	Carbon Tetrachloride	Chloroform	Methylene Chloride	Ethylene Dibromide	Temerature (°C)	pH	Conductivity (µS/cm)
GW01	HLGW01-W-23828	166[b]	6/28/07	DW	903	37	1.4	3.2	NR[c]	NR	NR
SB01	HLSB01-W-23824	144-164	6/27/07	MW	ND[d]	ND	ND	ND	17.3	7.46	917
SB04	HLSB04-W-23827	130-135	6/28/07	MW	ND	ND	ND	ND	17.4	7.57	658
SB06	HLSB06-W-23826	99-109	6/28/07	MW	ND	ND	ND	ND	18.4	7.55	728
SB07	HLSB07-W-23825	146.5-166.5	6/28/07	MW	ND	ND	ND	ND	17.1	7.51	947
TI01	HLTI01-W-23789	40-50	6/24/07	CPT	ND	ND	ND	ND	17.6	7.15	1560
TI01	HLTI01-W-23763	83-88	6/23/07	CPT	ND	ND	ND	ND	16.2	7.39	980
TI01	HLTI01-W-23762	99.9-104.9	6/22/07	CPT	ND	ND	ND	ND	19.1	7.48	1198
TI02	HLTI02-W-23793	86-91	6/25/07	CPT	ND	ND	ND	ND	17.3	7.51	901
TI02	HLTI02-W-23791	99-104	6/24/07	CPT	ND	ND	ND	ND	18.5	7.50	720
TI03	HLTI03-W-23797	53-58	6/25/07	CPT	ND	ND	ND	ND	18.1	7.28	1094
TI03	HLTI03-W-23796	83-88	6/25/07	CPT	ND	ND	ND	ND	17.0	7.55	1045
TI03	HLTI03-W-23794	96-101	6/25/07	CPT	ND	ND	ND	ND	18.5	7.55	689

[a] Sample types: CPT, cone penetrometer; DW, domestic well; MW, monitoring well.

[b] Total depth of well.

[c] NR, field measurements not recorded.

[d] ND, contaminant not detected at the instrument detection limit of 0.1 µg/L for the purge-and-trap method.

Water temperature, pH, and conductivity were measured in the field for all groundwater samples collected. The field measurements were made by using a Checkmate field meter system calibrated with appropriate standard solutions. Results are in Table 3.2.

3.4 Installation of Temporary Piezometers

The CPT sensor logs were analyzed to identify potentially water-bearing units. Confirmatory soil and groundwater sampling followed. Temporary piezometers were installed in all identified water-bearing units underlying the former CCC/USDA facility.

The temporary piezometers at Hilton were set by using 0.5-in. PVC screen (0.010-in. slot) and 0.5-in. Schedule 40 PVC riser pipe. The riser pipe was terminated 12 in. above ground level and fitted with a locking J-plug. Filter pack sand (10/20) was installed from total depth to 2 ft above the top of the screen. A 4-ft bentonite plug was placed above the filter pack, hydrated, and allowed to set for 20 min. Next, 20% high-solids bentonite was mixed and introduced into the hole through a tremie pipe, from the top of the bentonite plug to the surface. After five days, the piezometers were plugged. In the plugging process, the PVC riser pipe and screen were

TABLE 3.3 Construction data for temporary piezometers installed during the 2007 targeted investigation.

Piezometer	Reference Elevation[a] (ft AMSL)	Depth (ft BGL)	Diameter (in.)	Screen Interval (ft BGL)
TI01	1519.74			
A		50	1	40–50
B		88	1	83–88
C		104.9	1	99.9–104.9
TI02	1520.72			
A		91	1	86-91
B		104	1	99-104
TI03	1520.40			
A		58	1	53-58
B		88	1	83-88
C		101	1	96-101

[a] Elevation at the ground surface.

pulled from the hole, and 20% high-solids bentonite grout was mixed and placed in the hole from total depth to the surface, by use of a tremie pipe. All procedures used were consistent with regulations of the KDHE Bureau of Water.

3.5 Groundwater Level Data

Groundwater levels were measured at temporary piezometers TI01, TI02, and TI03 and at existing monitoring points SB01, SB04, SB06, and SB07 (Figure 2.1). Manual measurements were read to the nearest 0.01 ft with an electronic water level sensor from a surveyed reference mark. Water level data are summarized in Table 3.4.

TABLE 3.4 Groundwater level measurements made at temporary piezometers and existing monitoring points during the 2007 targeted investigation.

	Depth (ft BGL)		Elevation (ft AMSL)	
Location	Screen Interval	Water Level	Reference[a]	Water Level
SB01	144-164	78.19	1521.03	1442.84
SB04	130-135	68.72	1512.52	1443.80
SB06	99-109	71.20	1516.34	1445.14
SB07	146.5-166.5	76.31	1519.22	1442.91
TI01			1519.74	
A	40-50	38.04		1481.70
B	83-88	39.21		1480.53
C	99.9-104.9	43.60		1476.14
TI02			1520.72	
A	86-91	49.37		1471.35
B	99-104	42.87		1477.85
TI03			1520.40	
A	53-58	38.42		1481.98
B	83-88	38.59		1481.81
C	96-101	40.68		1479.72

[a] Elevation at a reference mark on the top of the casing or at the ground surface.

3.6 Coordinates Survey Data

The exact locations of field activities are required to provide horizontal and vertical control for stratigraphic correlation, water level measurement, and hydrogeologic mapping. All investigative boring locations and existing monitoring points were surveyed by licensed professional surveyors, Schwab-Eaton of Manhattan, Kansas. The results are in Appendix C, Table C.1.

3.7 Results of Quality Control Activities

The QC/QC procedures for sample collection, handling, and analysis during the 2007 targeted investigation were described in detail in the M*aster Work Plan* (Argonne 2002). A detailed QC/QC report addressing activities related to sample collection, handling, and analysis during the investigation is in Appendix D.

Results of QA/QC activities are summarized as follows:

- Sample integrity was maintained successfully throughout the collection, shipping, and analysis activities through documentation of samples as they were collected and the use of custody seals and chain-of-custody records.

- All samples were received with custody seals intact and at the appropriate preservation conditions. All samples were analyzed within the required holding times.

- Carbon tetrachloride, chloroform, and 1,2-dibromoethane (ethylene dibromide), contaminants of concern in the investigation, were not detected in laboratory method blanks analyzed with the samples. Chloroform was detected at a trace concentration in the methanol used for extraction of the soil samples.

- As an indicator of cross-contamination, seven trip blanks were prepared and shipped with soil or water samples to laboratories for organic analyses.

Contaminants of concern were not detected in trip blanks shipped with samples for organic analyses.

- Two equipment rinsates were collected to monitor decontamination procedures for reusable sampling equipment. Contaminants of concern were not detected in the rinsate samples, indicating that cross-contamination of groundwater samples did not occur during sample collection.

- Soil and groundwater samples were analyzed for carbon tetrachloride, chloroform, and 1,2-dibromoethane (ethylene dibromide) at the AGEM Laboratory by using the purge-and-trap method. Dual analyses of samples indicated consistency in the sampling and analytical methodologies. Dual analyses involved either analyses of replicate samples submitted to the laboratory or duplicate analyses of samples selected by the laboratory. Consistency in both the sampling and analytical methodologies is indicated. The data from the AGEM Laboratory are acceptable for quantitative determination of contaminant distribution.

- The analyses of water samples at the AGEM Laboratory with EPA Method 524.2 were verified by a second laboratory with EPA-defined CLP methodology. Of the 16 groundwater samples and replicates analyzed at the AGEM Laboratory, 3 (19%) were also analyzed with CLP methodology by Envirosystems, Inc., Columbia, Maryland. Agreement was good over the range of contaminant concentrations detected. Samples analyzed at the AGEM Laboratory were analyzed by the CLP laboratory with similar results. Outside laboratory data are in Appendix E.

- The analyses of soil samples at the AGEM Laboratory with EPA Method 8260B were verified by a second laboratory with the same analytical method. Of the 44 soil samples analyzed at the AGEM Laboratory, 5 (11%) were also analyzed by Severn-Trent Laboratories, Inc., Colchester, Vermont. Agreement was good over the range of contaminant concentrations detected. Soil samples analyzed at the AGEM Laboratory were analyzed by Severn-Trent with similar results. Outside laboratory data are in Appendix E.

3.8 Waste Characterization, Handling, and Disposal

Wastewater generated during investigation activities was placed in containers and held on the site. To determine the appropriate disposal method, wastewater samples were analyzed by Pace Analytical Services, Inc., Lenexa, Kansas, for VOCs (EPA Method 8260), 1,2-dibromoethane (ethylene dibromide; EPA Method 504.1), and nitrate-nitrite nitrogen (EPA Method 353.2). On the basis of the analytical results (Table D.2, Appendix D), wastewater generated during the 2007 investigation was disposed of without treatment at the Sabetha publicly owned treatment works (Sabetha 2007). Outside laboratory data are in Appendix E.

4 Data Interpretation

This section presents the interpretation of data acquired during the 2007 targeted investigation. As discussed in Section 2, the targeted investigation ended after completion of Segment 1 and the additional activities (part of Segment 2) requested by the KDHE. The absence of carbon tetrachloride contamination in soil and groundwater, as determined by the Segment 1 activities, was evaluated by the CCC/USDA and KDHE project managers, according to the procedure described in the approved *Work Plan* (Argonne 2007). The project managers agreed that completion of the subsequent segments was not necessary.

Four specific technical objectives were proposed for the 2007 targeted investigation (Section 1.2). Because no contamination was found in Segment 1 activities on the former CCC/USDA property west of the former railroad tracks, the investigation addressed only the following two objectives:

1. Investigate for carbon tetrachloride contamination in the shallower soil and shallow aquifer units below the former CCC/USDA property.

2. Investigate groundwater flow patterns.

In this section, data are discussed and interpreted in the context of these two specific technical objectives.

4.1 Investigation for Carbon Tetrachloride Contamination in the Shallower Soil and Shallow Aquifer Units on the Former CCC/USDA Property

4.1.1 Local Hydrostratigraphic Units beneath the Former CCC/USDA Property

Earlier investigations (Argonne 1997a,b) had confirmed the primary lithologic units present in the shallow geologic section that forms the unconsolidated geologic framework overlying the Middle Permian shale of the Wellington Formation at Hilton. The primary unconsolidated lithologic sequences consist of (1) overbank deposits that are mainly calcareous silty clays and clays, (2) a sandy unit within the silty clay matrix (the shallow aquifer), and (3) underlying sands of the fluvial facies (part of the main Equus Beds aquifer). The second and

third units are important hydrostratigraphically. The shallow aquifer was found locally at SB06. The main Hilton aquifer (Equus Beds) is absent at SB06 but is present at SB01, SB04, and SB07. In the Hilton area, along the edge of the McPherson paleochannel, the Equus Beds aquifer is relatively thin (less than 15 ft thick), in comparison to a thickness of 100-200 ft in the McPherson paleochannel (EBIR 2007).

The former CCC/USDA facility was located between previously investigated locations SB06 and SB07. To achieve a more detailed understanding of the significant shallow aquifer units in the shallow deposits of silty clays below the former property, the patterns of lithology, moisture content, and water availability there were evaluated in conjunction with qualitative correlations drawn through comparison of CPT sensor logs to the core log collected at boring TI01. The two-dimensional geometry and structure of the main stratigraphic sequences and the significant sandy units are illustrated in two interpretive geologic cross sections (C-C' and B-B') constructed at the locations shown in Figure 4.1. The hydrostratigraphic relationships are demonstrated in one hydrogeologic cross section (C-C').

Geologic cross section C-C' (Figure 4.2) extends across the former CCC/USDA property from south to north. At locations TI01-TI03, the CPT penetrated the shallow section to a depth of 108-130 ft BGL, approximately at or below the depth of the shallow aquifer identified at SB06 in the Phase II investigation (Argonne 1997b). The core and CPT sensor logs obtained at the three targeted investigation locations suggested three main stratigraphic sequences below the former CCC/USDA property: (1) a top clay layer, (2) a nodular clay zone consisting of abundant calcareous nodules in a clay matrix, and (3) a silty clay layer with multiple sandy silt lenses. The first two layers extend to a depth of 20-36 ft BGL. The underlying silty clay layer is about 80 ft thick and includes several sandy silt lenses that are significant in that they host groundwater and potentially form contaminant migration pathways. An additional lower layer of nodular clay at TI01 was determined on the basis of comparison with lithology and CPT logs for locations SB06 and SB07.

Interpreted patterns of increased CPT sensor tip stress, increased sleeve stress, and reduced conductance, as confirmed by core logs and groundwater sampling, were used to identify potentially water-bearing sandy silt lenses. Two thin (≤ 10-ft), deeper sandy silt lenses at elevations of 1,415 ft AMSL and 1,430 ft AMSL, respectively, were found to consist primarily of clayey silt with abundant sand inclusions. These sandy silt lenses were persistent at all three CPT investigation locations. The CPT sensor responses suggested, however, that the lenses

identified at TI02 and TI03 are not nearly as well developed as those at TI01. Indeed, groundwater was produced slowly at locations TI02 and TI03. A shallower sandy silt zone was identified at locations TI01 and TI03 but not at TI02. At location TI01, a sandy zone about 10 ft thick was composed of three separate sand lenses in a matrix of clayey silts. This relatively permeable zone produced relatively large amounts of groundwater.

Results of the current investigation indicate that the water-bearing, sandy silt lenses form perched aquifer units within the silty clay layer. These perched aquifer units would be most vulnerable to groundwater contamination if contaminant sources were present in soil beneath the former CCC/USDA facility. The relationships of the perched aquifers and their hydraulic connectivity are discussed in Section 4.2.

Geologic cross section B-B' (Figure 4.3), constructed from west to east, depicts the relationships among the main stratigraphic units identified at the former CCC/USDA facility and in the surrounding areas. Three significant aquifer/water-bearing sandy units were identified, as follows: (1) multiple thin, perched aquifers in a silty clay matrix below the former CCC/USDA facility (location TI01), (2) a shallow aquifer also in the silty clay layer at location SB06, and (3) the main Hilton aquifer (Equus Beds; at SB04, SB07, and the Foster Farms well). The local perched aquifers identified in the silty clay layer below the former CCC/USDA facility were not nearly as well developed or as permeable as the shallow aquifer unit identified at SB06, 1,000 ft west of the former facility. These perched aquifers below the former facility, however, are the only natural channels that could act as pathways for contaminant migration to the underlying main Hilton aquifer (Equus Beds) if contaminant sources were present at the former CCC/USDA property. Thus, the perched aquifers are of importance for the investigation of possible carbon tetrachloride contamination in groundwater at the former facility.

4.1.2 Identification of Potential Carbon Tetrachloride Contamination in Shallower Soil below the Former CCC/USDA Property

Soil profiling was performed at all CPT investigation locations on the former CCC/USDA property. At each location, soil samples were collected at 4-ft intervals from near the ground surface to the depth of the uppermost perched aquifer (40-50 ft BGL) identified below the former property. Additional soil samples were also collected at and below the depth of the perched aquifer at TI01. In the organic analyses, carbon tetrachloride, chloroform, and 1,2-dibromoethane (ethylene dibromide) were not present above the instrument detection limit

(1.0 µg/kg) in any soil sample (Table 3.1). Therefore, no soil contamination was identified in the vadose zone below the former CCC/USDA facility. The Kansas Tier 2 risk-based screening level for carbon tetrachloride, for the soil-to-groundwater protection pathway, is 200 µg/kg.

4.1.3 Identification of Potential Carbon Tetrachloride Contamination in the Shallow Aquifer below the Former CCC/USDA Property

Groundwater samples were collected from all perched aquifers identified in the silty clay matrix below the former CCC/USDA facility. These aquifers are illustrated in interpretive hydrogeologic cross section C-C' (Figure 4.4). All groundwater samples were analyzed for VOCs including 1,2-dibromoethane (ethylene dibromide). No contaminants were detected in samples from any perched aquifer below the former CCC/USDA facility. The results for groundwater samples are consistent with absence of soil sources in the vadose zone below the former facility.

Additional groundwater samples were collected for VOCs analyses from existing monitoring wells/piezometers SB01, SB04, SB06, and SB07 and the Mid-Kansas Co-op's contaminated well, GW01. Contaminants were detected *only* in the groundwater sample from well GW01. This sample contained elevated carbon tetrachloride at a concentration of 903 µg/L, chloroform at 37 µg/L, and 1,2-dibromoethane (ethylene dibromide) at 3.2 µg/L. Well GW01 is *east* of the former railroad tracks, at a distance from the former CCC/USDA property.

Figure 4.5 shows the lateral distribution of carbon tetrachloride in groundwater samples collected during the 2007 targeted investigation. The results confirm that carbon tetrachloride contamination is limited to well GW01 on the Mid-Kansas Co-op facility, *east* of the former railroad tracks.

4.2 Investigation for Groundwater Flow Patterns

Three types of aquifer systems were identified beneath the former CCC/USDA facility and in the vicinity of Hilton, as described in Section 4.1.1. These aquifers systems are (1) multiple thin (≤ 10 ft), less permeable, perched aquifers found locally in the silty clay matrix below the former CCC/USDA property; (2) the relatively thick and permeable shallow aquifer at SB06; and (3) the deep main Hilton aquifer (Equus Beds). The characteristics of these identified

aquifer units and the water level data for each aquifer were analyzed and interpreted to determine groundwater flow patterns within and among aquifers, as described below.

4.2.1 Vertical Flow Patterns among Aquifer Units

The local, multiple perched aquifers below the former CCC/USDA facility are illustrated in hydrogeologic cross section C-C' (Figure 4.4). Water levels measured for the individual perched aquifers are different, indicating that the units are poorly connected through the leaky confining layer of the silty clay matrix. Groundwater flow between the perched aquifers is mostly downward from the upper perched aquifer to the lower perched aquifer, except at location TI02, where the upper perched aquifer may receive locally upward groundwater flow from the lower perched aquifer. During the field investigation, an attempt was made to collect a groundwater sample in a zone above the perched aquifer at TI02. The lack of success indicates that no other upper perched aquifer is present at TI02 to provide downward groundwater flow. This conclusion is consistent with the absence of significant responses by the CPT sensors at TI02 (Figure 4.2).

The thick, relatively permeable shallow aquifer at SB06 is also within the silty clay interval and is located at a depth consistent with the depths of the two lower perched aquifers identified below the former CCC/USDA facility (Figure 4.3). However, the available data do not clarify the hydraulic relationship between the shallow aquifer at SB06 and the multiple perched aquifers beneath the former CCC/USDA facility, though the water level of the shallow aquifer at SB06 is about 30 ft lower than the water levels of the perched aquifers beneath the former CCC/USDA facility. Complete characterization of the hydraulic relationships was beyond the scope of the 2007 targeted investigation.

The main Hilton aquifer (Equus Beds) underlies the nodular clay layer and silty clay layer. Water levels in the main Hilton aquifer are much lower than water levels in the perched aquifers and slightly lower than the water level in the shallow aquifer at SB06. Downward groundwater flow via leaky confining clay layers is most probable from the perched aquifers and the shallow aquifer to the main Hilton aquifer.

4.2.2 Lateral Flow Patterns in the Main Hilton Aquifer

Water levels in the main Hilton aquifer (Equus Beds) were measured at all monitoring points screened exclusively in this aquifer (SB01, SB04, and SB07). Water level data for these locations are shown in Figure 4.6. Because only three data points are available and they are distributed unevenly, a reliable, accurate potentiometric surface could not be constructed for the area. However, groundwater flow in the main Hilton aquifer, in general, appears to be in a southwesterly direction. This finding is consistent with the regional flow pattern estimated on the basis of January 1997 regional water level data (KGS 1997) and with Argonne's Phase II data (Figure 4.5 in Argonne 1997b).

As discussed in Section 4.2.1, the multiple thin, perched aquifer units found locally in the unsaturated matrix of the silty clay are poorly connected. Lateral flow through the unsaturated matrix between perched aquifers is generally insignificant and complicated. Predicting a general pattern of lateral flow through the unsaturated layer (between perched aquifers) is not feasible, because (1) the hydraulic connection among the perched aquifer units is poor to absent and (2) the heterogeneous, inconsistent variations in water levels for the individual perched aquifer units preclude treatment of these units as a single flow system following a simple pattern. Consequently, no attempt could be made to determine a general lateral flow pattern for the perched aquifers identified within the unsaturated layer.

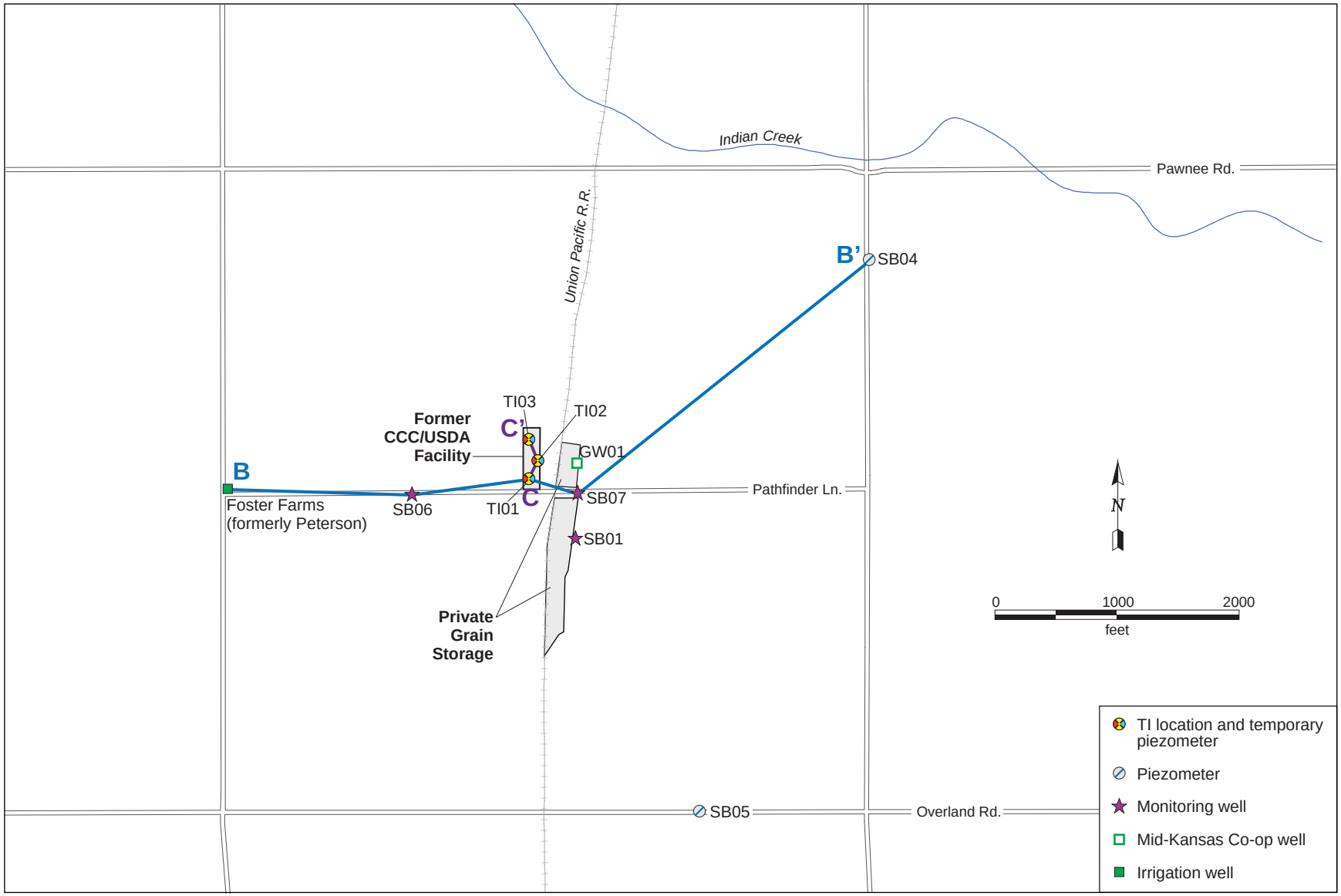

FIGURE 4.1 Locations of wells, piezometers, and geologic cross sections in the 2007 targeted investigation at Hilton.

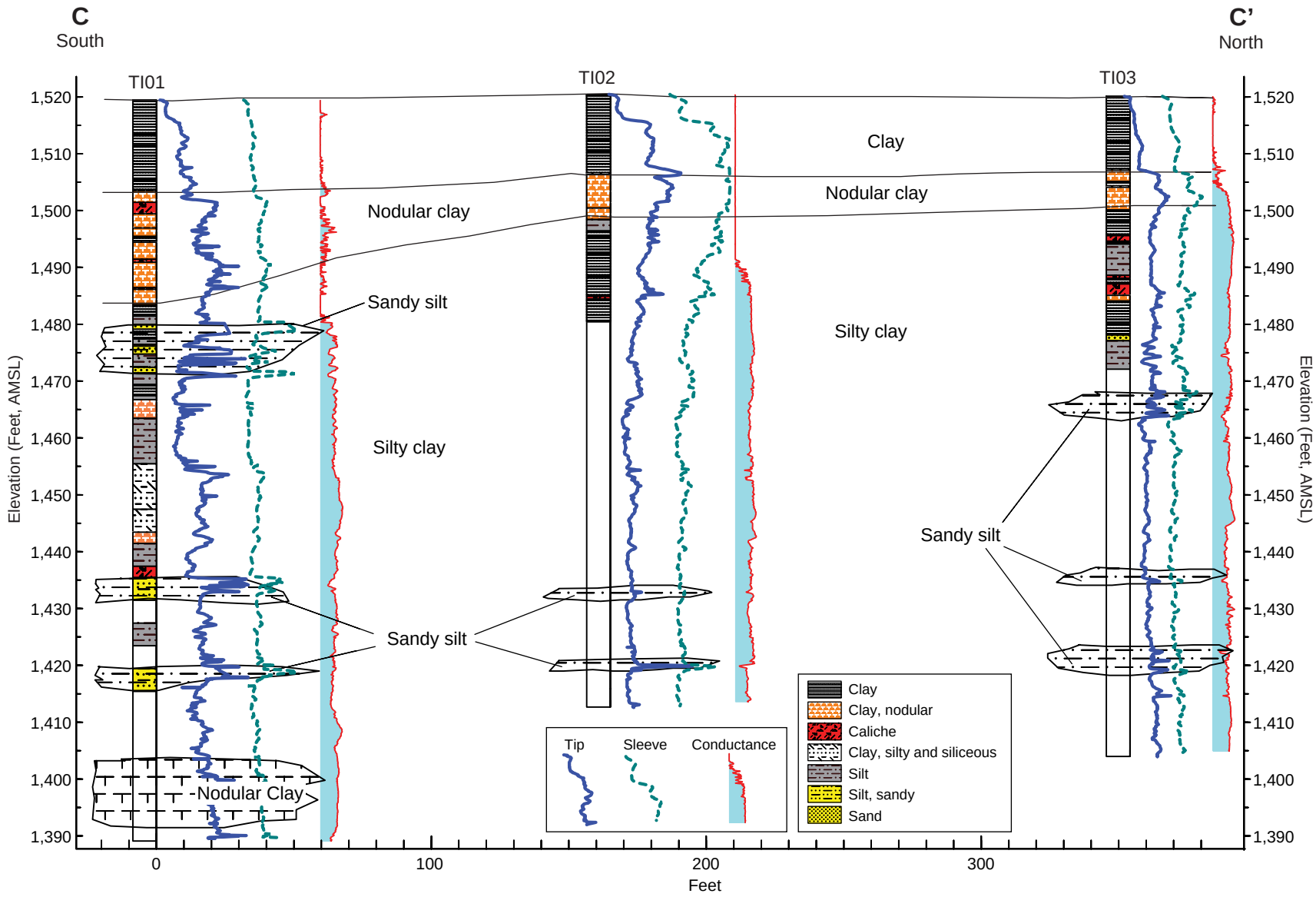

FIGURE 4.2 Interpretive south-to-north geologic cross section C–C′ (vertically exaggerated), illustrating the local stratigraphic relationships beneath the former CCC/USDA property at Hilton.

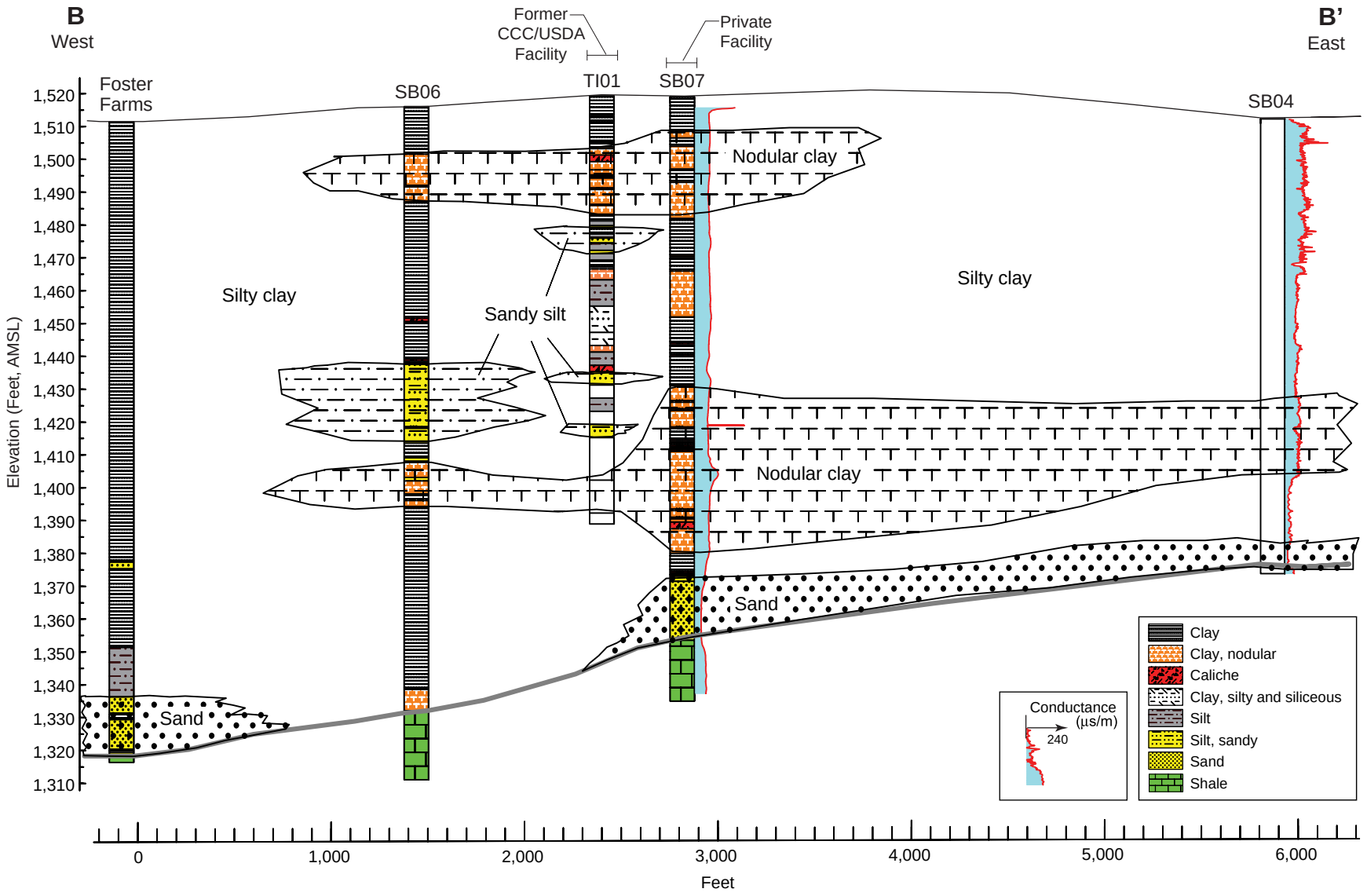

FIGURE 4.3 Interpretive west-to-east geologic cross section B–B′ (vertically exaggerated), illustrating the local stratigraphic relationships in the vicinity of the former CCC/USDA and private grain storage facilities at Hilton.

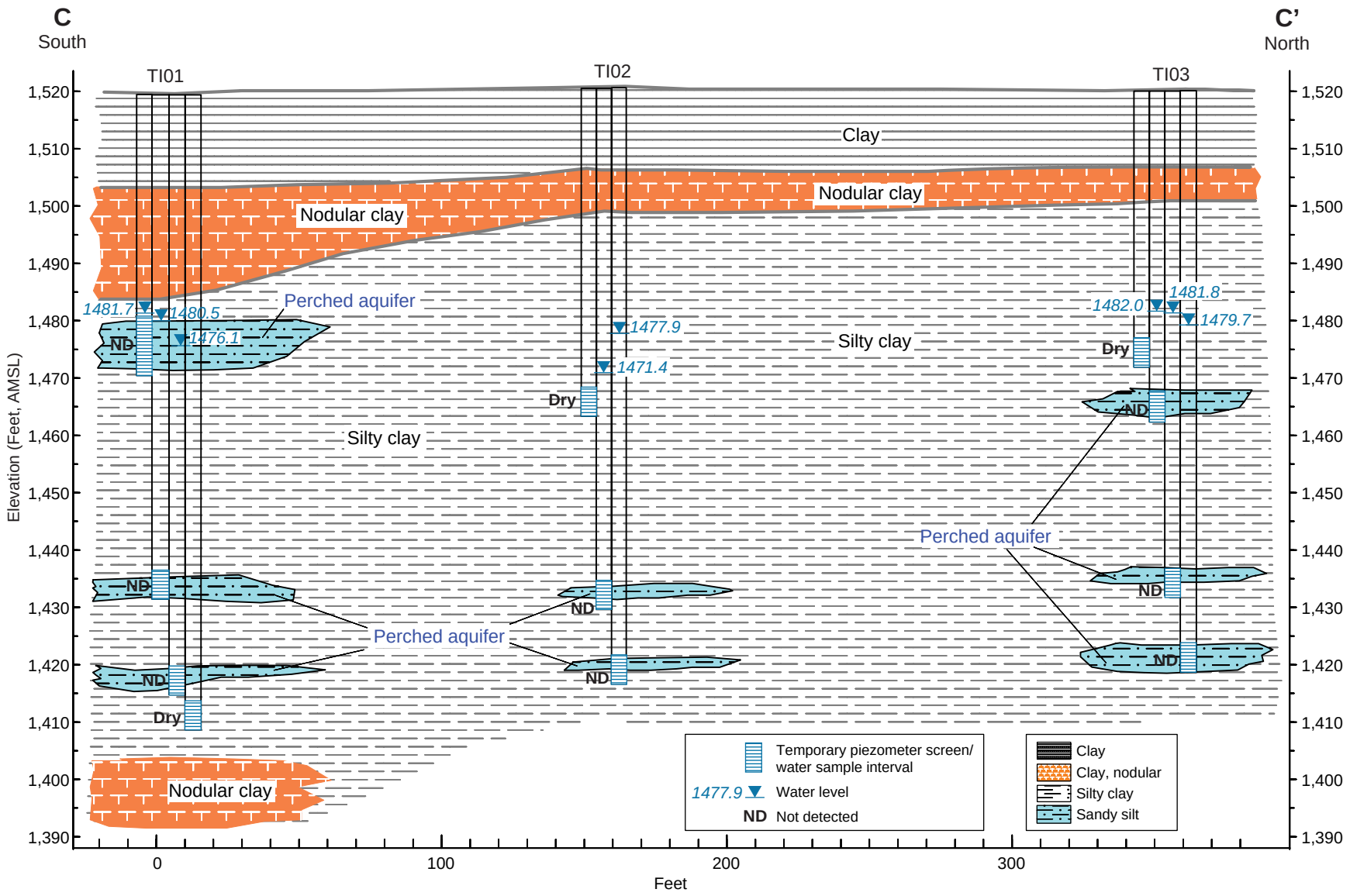

FIGURE 4.4 Interpretive south-to-north hydrogeologic cross section C–C′ (vertically exaggerated), illustrating the local hydrostratigraphic relationships and water levels beneath the former CCC/USDA property at Hilton.

FIGURE 4.5 Maximum carbon tetrachloride concentrations in groundwater samples collected during the 2007 targeted investigation at Hilton.

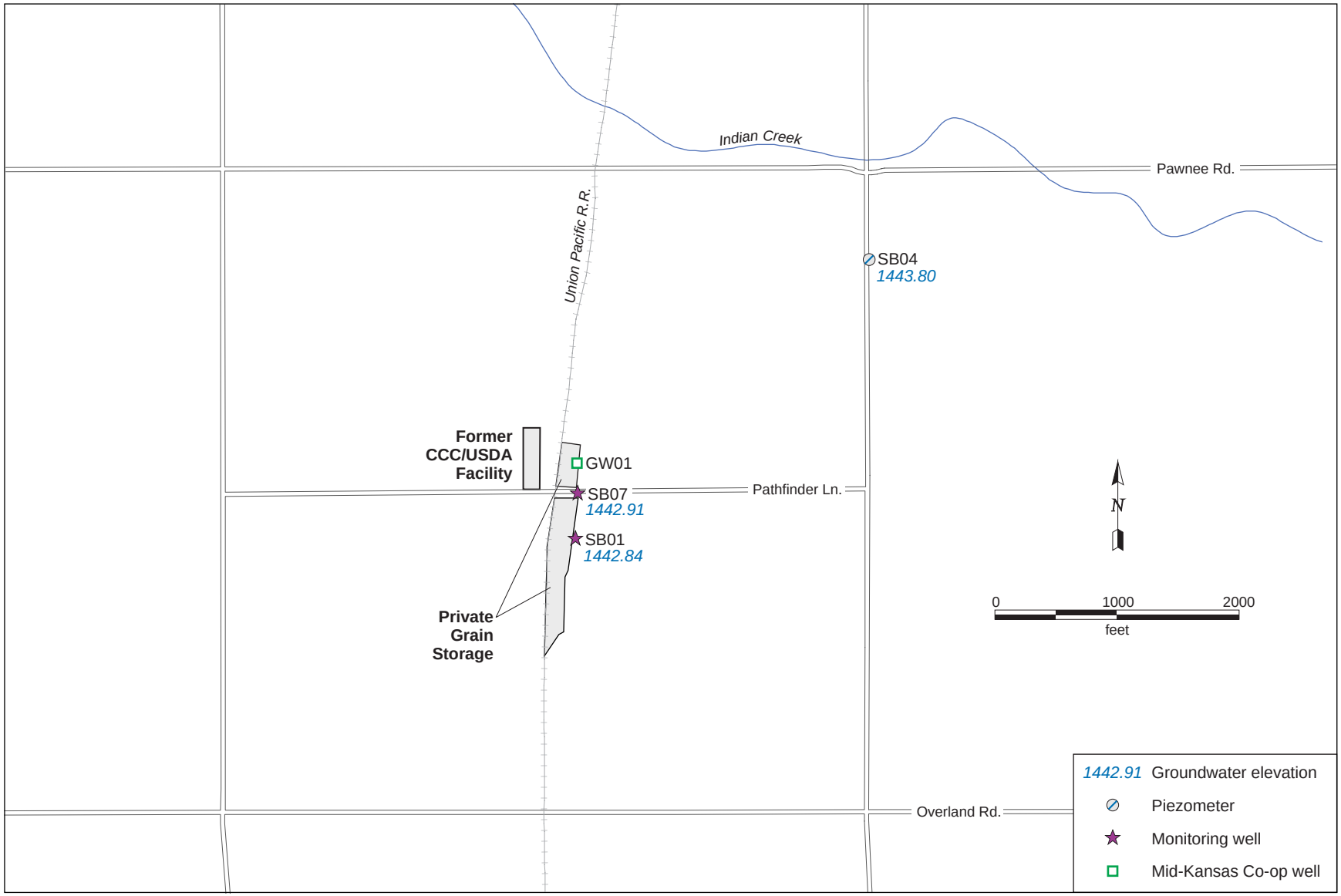

FIGURE 4.6 Water levels in the main Hilton aquifer unit (Equus Beds), as measured in June 2007 in the targeted investigation area.

5 Findings and Conclusions

Conclusions discussed in this section were developed on the basis of the combined results of Argonne's Phase I and Phase II investigations (Argonne 1997a,b) and the 2007 targeted investigation.

5.1 Findings

The findings of the combined investigations at Hilton are summarized as follows:

- No evidence was found for the presence of carbon tetrachloride or chloroform in the vadose zone soil below the former CCC/USDA facility.

- Multiple perched aquifers were identified in the silty clay layer below the former CCC/USDA facility, with generally downward hydraulic pressure from the upper perched aquifer to the lower perched aquifer.

- No evidence was found for the presence of carbon tetrachloride, chloroform, or 1,2-dibromoethane (ethylene dibromide) contamination in groundwater in any perched aquifer identified below the former CCC/USDA facility.

- The contaminants carbon tetrachloride, chloroform, and 1,2-dibromoethane (ethylene dibromide) were persistently found in groundwater *only* at well GW01, on the facility (east of the former railroad tracks) currently operated by Mid-Kansas Co-op. No evidence of contamination was found in groundwater samples from other monitoring wells and piezometers. This was a consistent finding in all previous investigations.

- Available data collected at locations SB01, SB04, and SB07 indicate that, in general, groundwater flow in the main Hilton aquifer (Equus Beds) appears to be in a southwesterly direction. This finding is consistent with previous determinations. Contaminated well GW01 is therefore upgradient from the former CCC/USDA facility.

5.2 Conclusions

The CCC/USDA's investigations at the Hilton site are complete. The findings clearly demonstrate that the former CCC/USDA facility was not the source of the carbon tetrachloride contamination persistently detected in well GW01, at concentrations above the maximum contaminant level (MCL) and Kansas Tier 2 risk-based screening level (RBSL) values of 5.0 µg/L. Contaminated well GW01 is approximately 300 ft east (upgradient) from the former CCC/USDA facility. This well is the only sampling location at Hilton where carbon tetrachloride contamination in groundwater has ever been identified. The CCC/USDA never operated grain storage facilities on the property on which well GW01 is located.

The 2007 targeted investigation at Hilton generated the following key findings that are relevant to determination of the CCC/USDA's future responsibilities at the site:

- No evidence for carbon tetrachloride or chloroform contamination was found in groundwater beneath the former CCC/USDA grain storage facility, at sampling locations and depths approved by the KDHE.

- No evidence for carbon tetrachloride or chloroform contamination was found in soil beneath the former CCC/USDA grain storage facility, at sampling locations and depths approved by the KDHE.

6 References

Argonne, 1997a, *Final Phase I Report and Phase II Work Plan: Expedited Site Characterization, Hilton, Kansas*, prepared for the Commodity Credit Corporation, U.S. Department of Agriculture, Washington, D.C., by Argonne National Laboratory, Argonne, Illinois, June.

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Appendix A:

Lithologic and Electronic Logs

Argonne National Laboratory

Boring ID: TI01

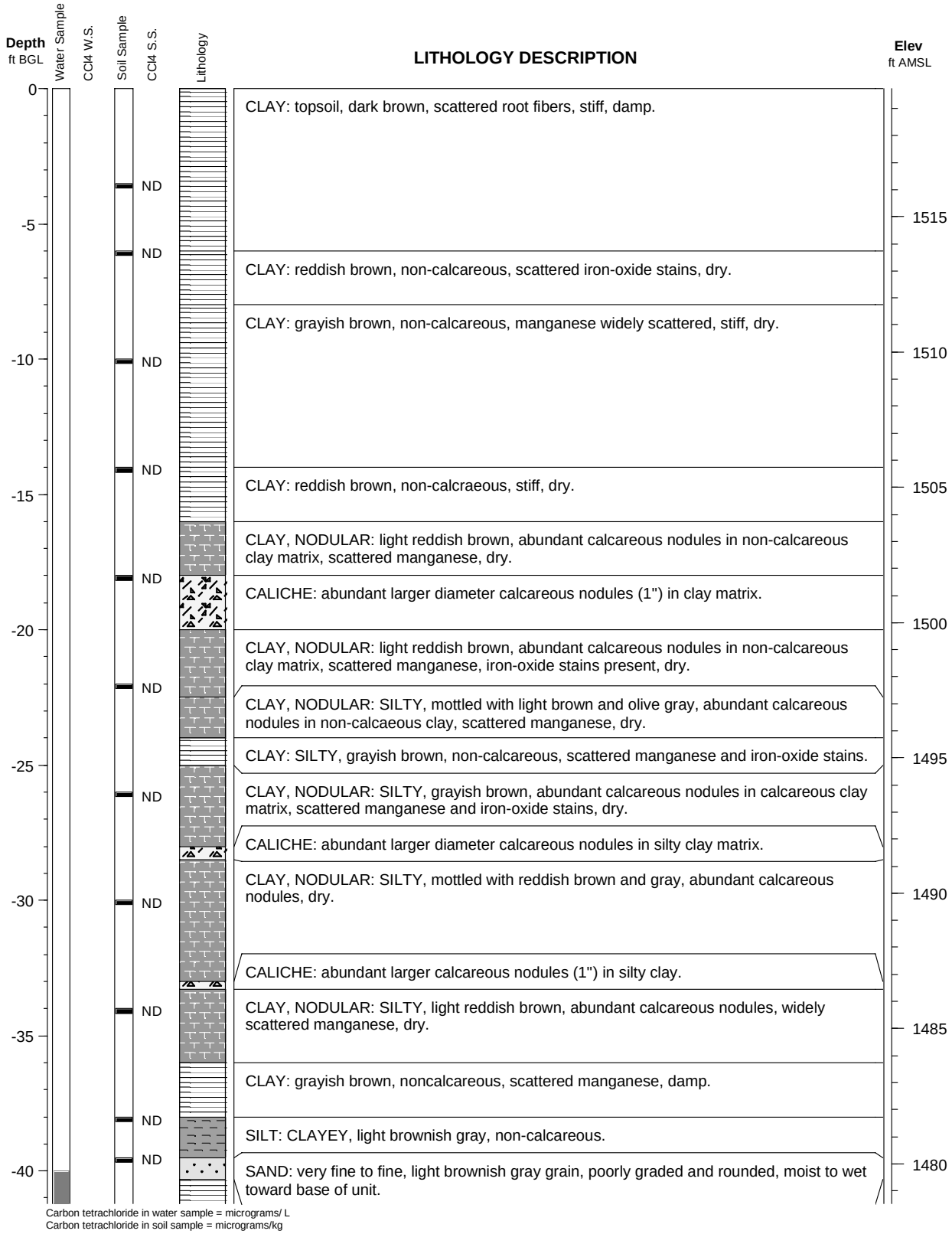
Project: Hilton, KS

Elevation: 1519.73 ft

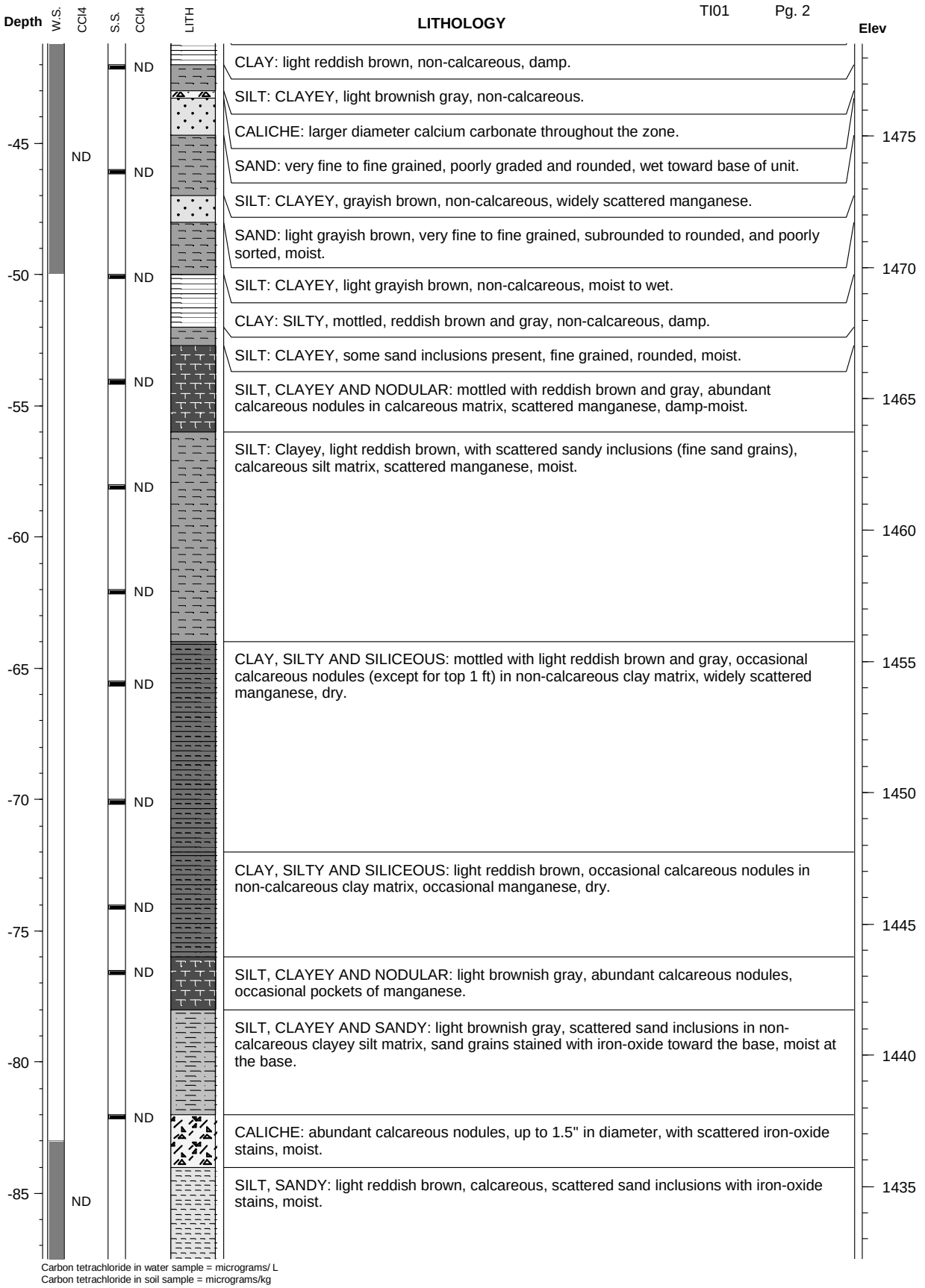
Geologist: Eugene Yan

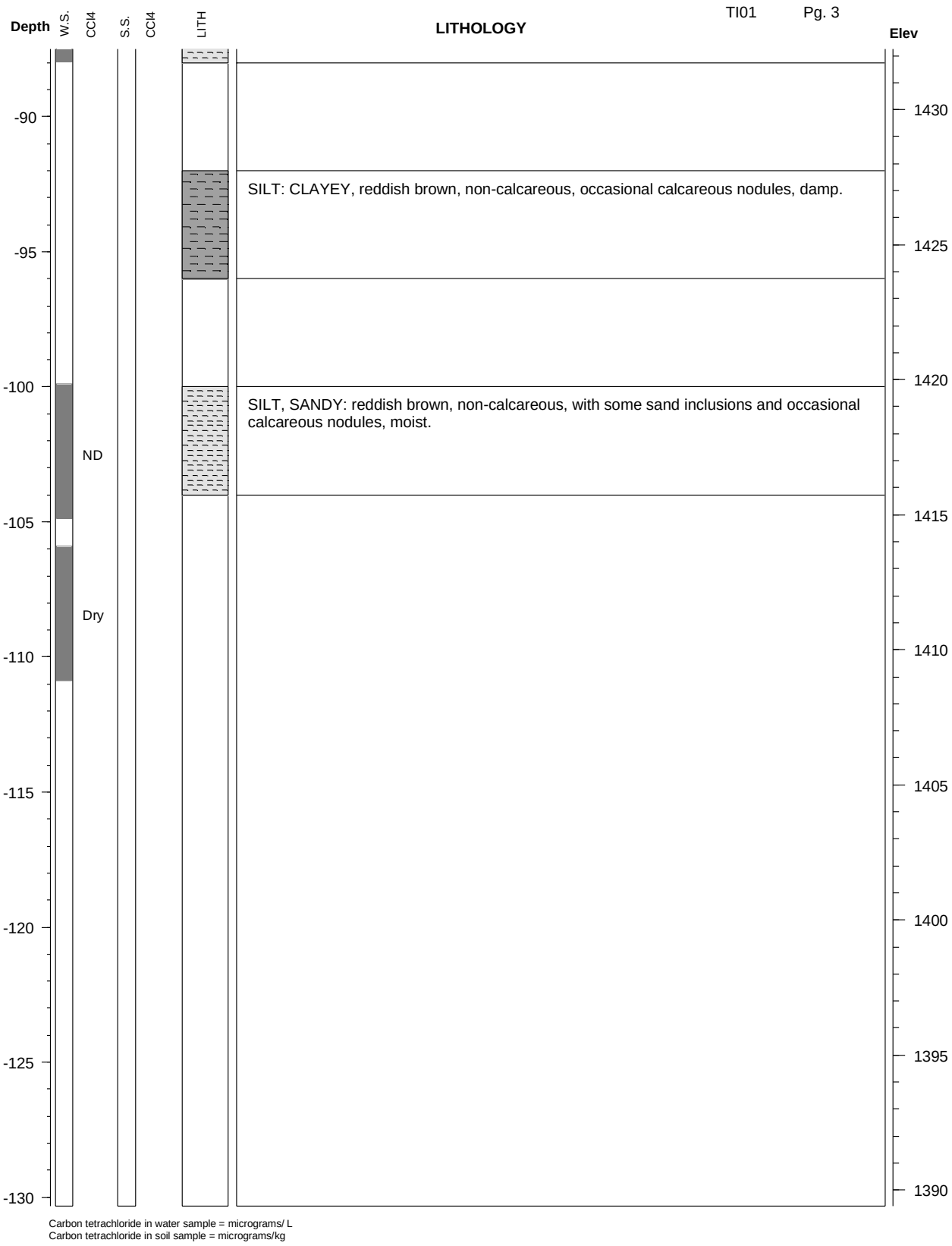
Depth: 130.32 ft BGL

Log Date: June 22-24, 2007



Carbon tetrachloride in water sample = micrograms/ L
Carbon tetrachloride in soil sample = micrograms/kg


Depth
W.S.
CCl4
S.S.
CCl4
LITH
LITHOLOGY
TI01 Pg. 2
Elev
CLAY: light reddish brown, non-calcareous, damp.
SILT: CLAYEY, light brownish gray, non-calcareous.
CALICHE: larger diameter calcium carbonate throughout the zone.
SAND: very fine to fine grained, poorly graded and rounded, wet toward base of unit.
SILT: CLAYEY, grayish brown, non-calcareous, widely scattered manganese.
SAND: light grayish brown, very fine to fine grained, subrounded to rounded, and poorly sorted, moist.
SILT: CLAYEY, light grayish brown, non-calcareous, moist to wet.
CLAY: SILTY, mottled, reddish brown and gray, non-calcareous, damp.
SILT: CLAYEY, some sand inclusions present, fine grained, rounded, moist.
SILT, CLAYEY AND NODULAR: mottled with reddish brown and gray, abundant calcareous nodules in calcareous matrix, scattered manganese, damp-moist.
SILT: Clayey, light reddish brown, with scattered sandy inclusions (fine sand grains), calcareous silt matrix, scattered manganese, moist.
CLAY, SILTY AND SILICEOUS: mottled with light reddish brown and gray, occasional calcareous nodules (except for top 1 ft) in non-calcareous clay matrix, widely scattered manganese, dry.
CLAY, SILTY AND SILICEOUS: light reddish brown, occasional calcareous nodules in non-calcareous clay matrix, occasional manganese, dry.
SILT, CLAYEY AND NODULAR: light brownish gray, abundant calcareous nodules, occasional pockets of manganese.
SILT, CLAYEY AND SANDY: light brownish gray, scattered sand inclusions in non-calcareous clayey silt matrix, sand grains stained with iron-oxide toward the base, moist at the base.
CALICHE: abundant calcareous nodules, up to 1.5" in diameter, with scattered iron-oxide stains, moist.
SILT, SANDY: light reddish brown, calcareous, scattered sand inclusions with iron-oxide stains, moist.
-45
-50
-55
-60
-65
-70
-75
-80
-85
ND
1475
1470
1465
1460
1455
1450
1445
1440
1435
Carbon tetrachloride in water sample = micrograms/ L
Carbon tetrachloride in soil sample = micrograms/kg



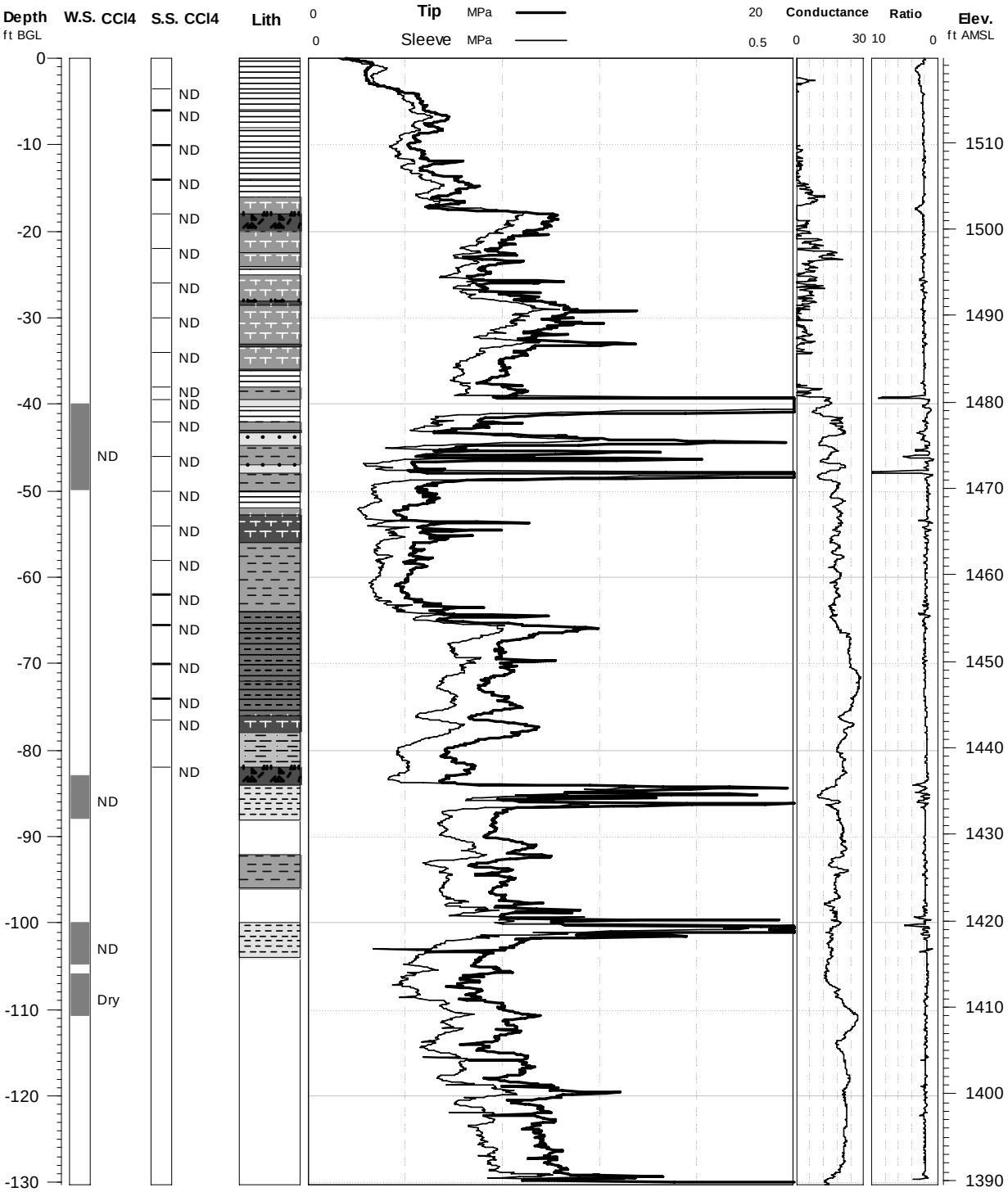
Carbon tetrachloride in water sample = micrograms/ L
Carbon tetrachloride in soil sample = micrograms/kg

Argonne National Laboratory

Boring ID: TI01

Project: Hilton, KS **Elevation:** 1519.73 ft

Geologist: Eugene Yan **Depth:** 130.32 ft BGL **Log Date:** June 22-24, 2007



Carbon tetrachloride in w ater sample = micrograms/L
Carbon tetrachloride in soil sample = micrograms/kg

Argonne National Laboratory

Boring ID: TI02

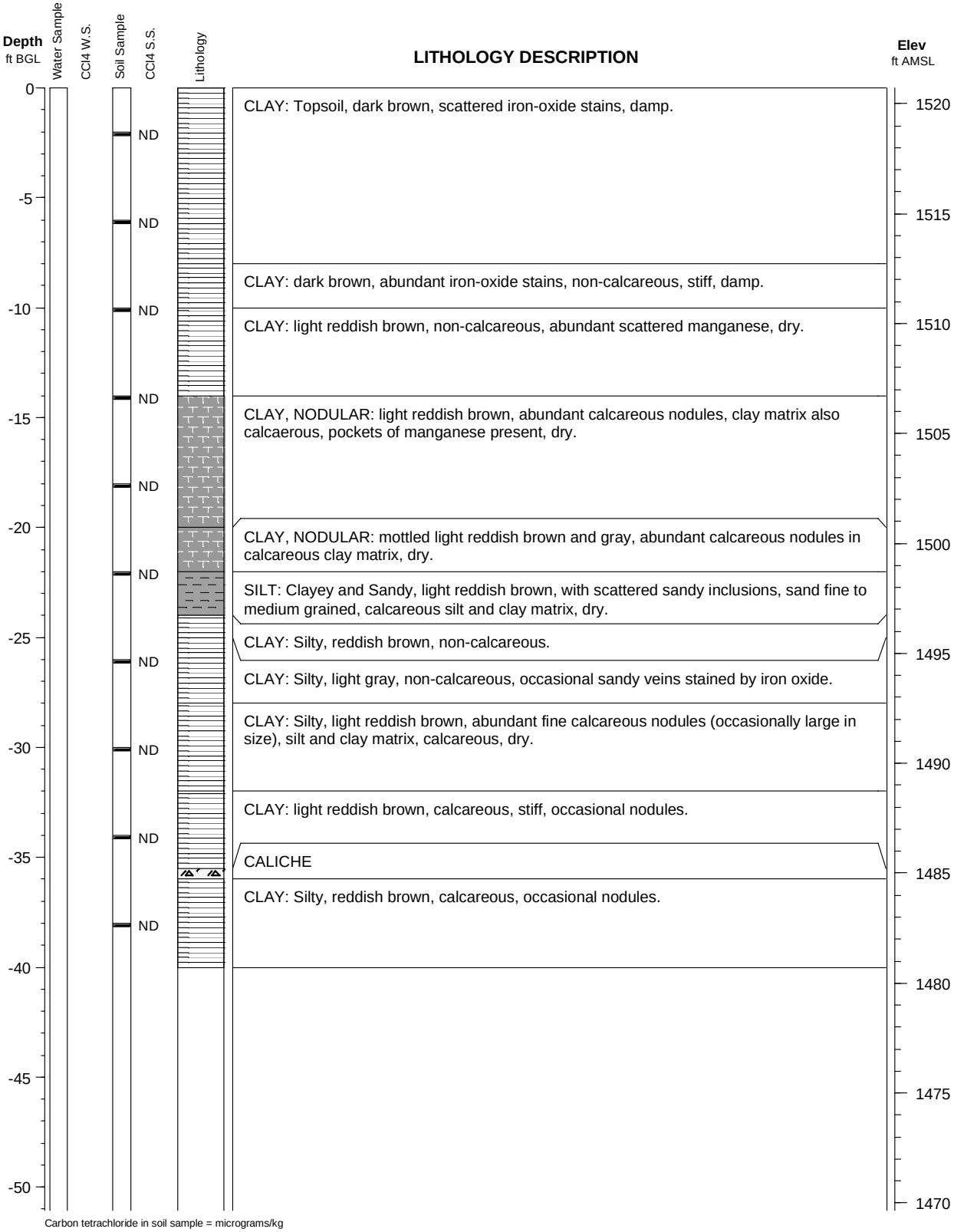
Project: Hilton, KS

Elevation: 1520.72 ft

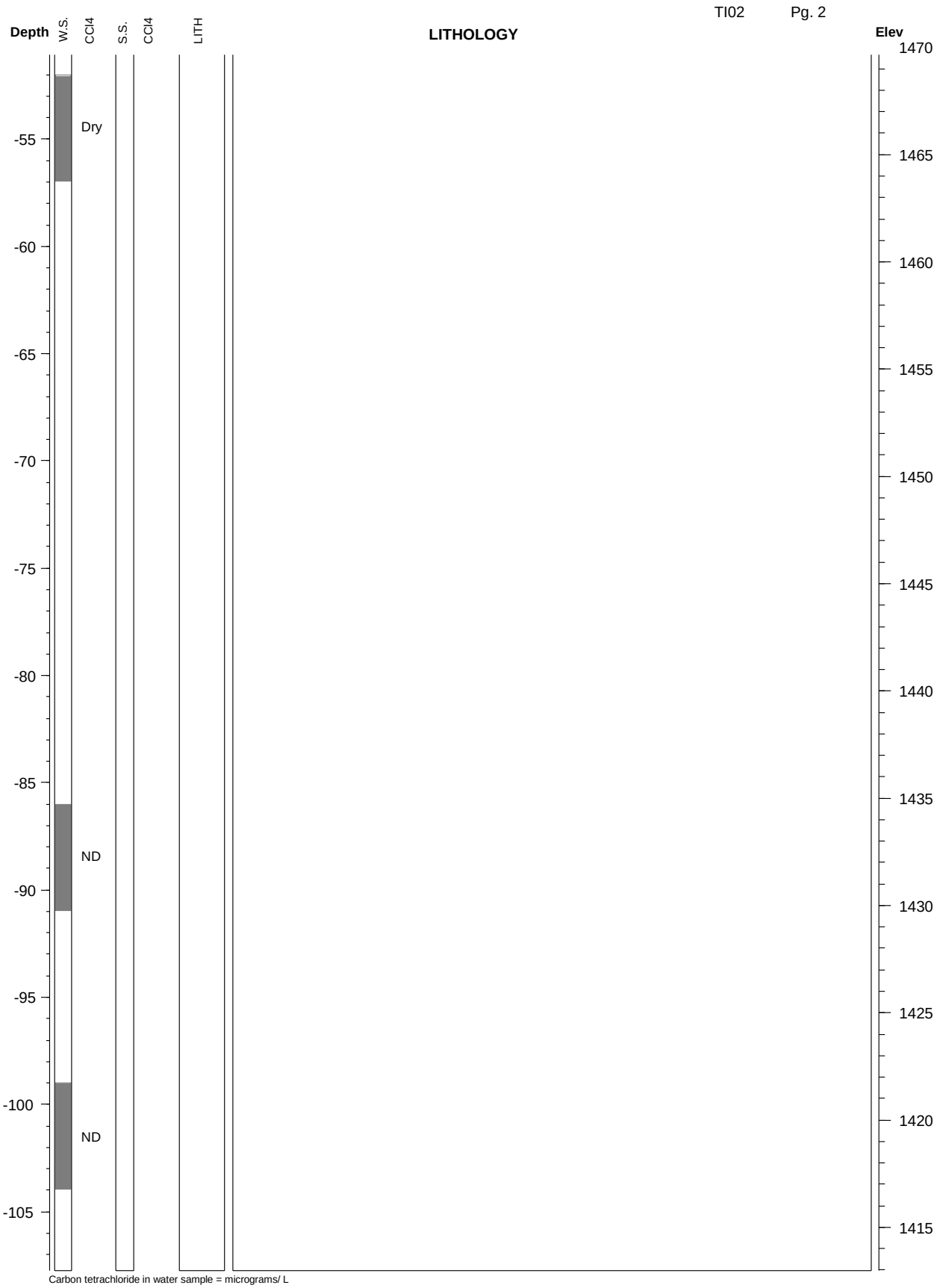
Geologist: Eugene Yan

Depth: 107.75 ft BGL

Log Date: June 24-26, 2007



Carbon tetrachloride in soil sample = micrograms/kg

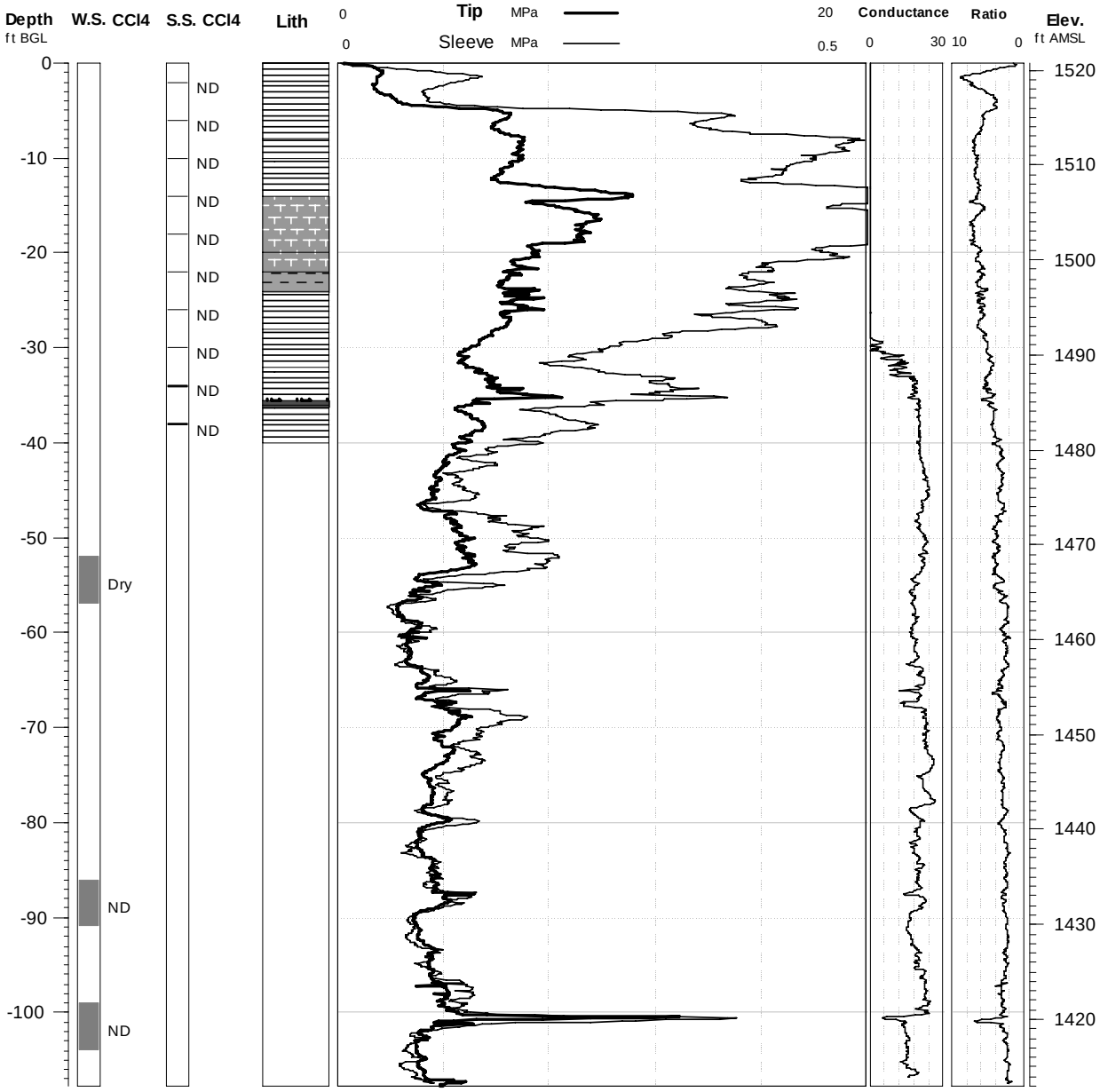

TI02 Pg. 2
Depth
W.S.
CCl4
S.S.
CCl4
LITH
LITHOLOGY
Elev
Dry
ND
ND
-55
-60
-65
-70
-75
-80
-85
-90
-95
-100
-105
1470
1465
1460
1455
1450
1445
1440
1435
1430
1425
1420
1415
Carbon tetrachloride in water sample = micrograms/ L

Argonne National Laboratory

Boring ID: TI02

Project: Hilton, KS **Elevation:** 1520.72 ft

Geologist: Eugene Yan **Depth:** 107.75 ft BGL **Log Date:** June 24-26, 2007

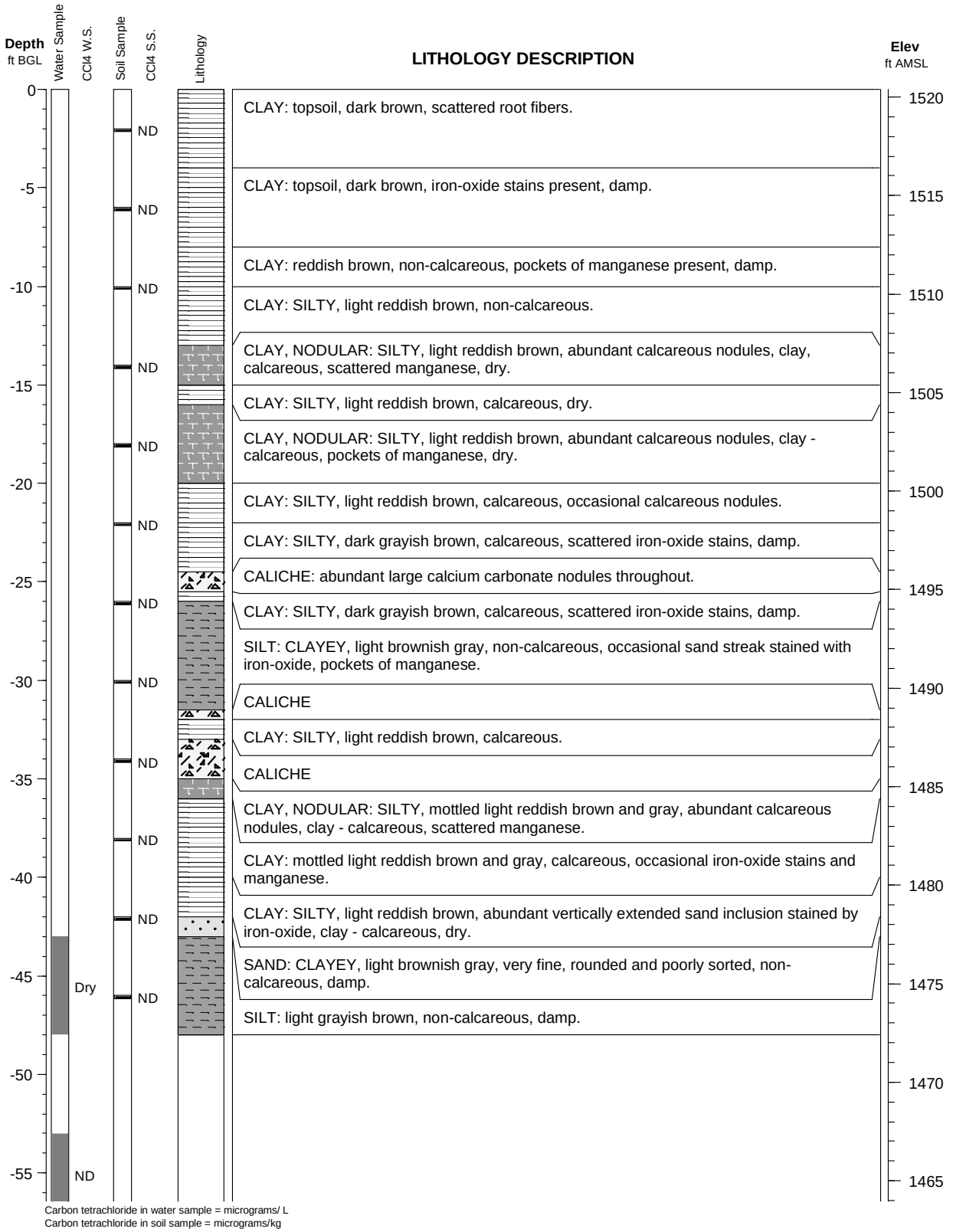


Carbon tetrachloride in water sample = micrograms/L
Carbon tetrachloride in soil sample = micrograms/kg

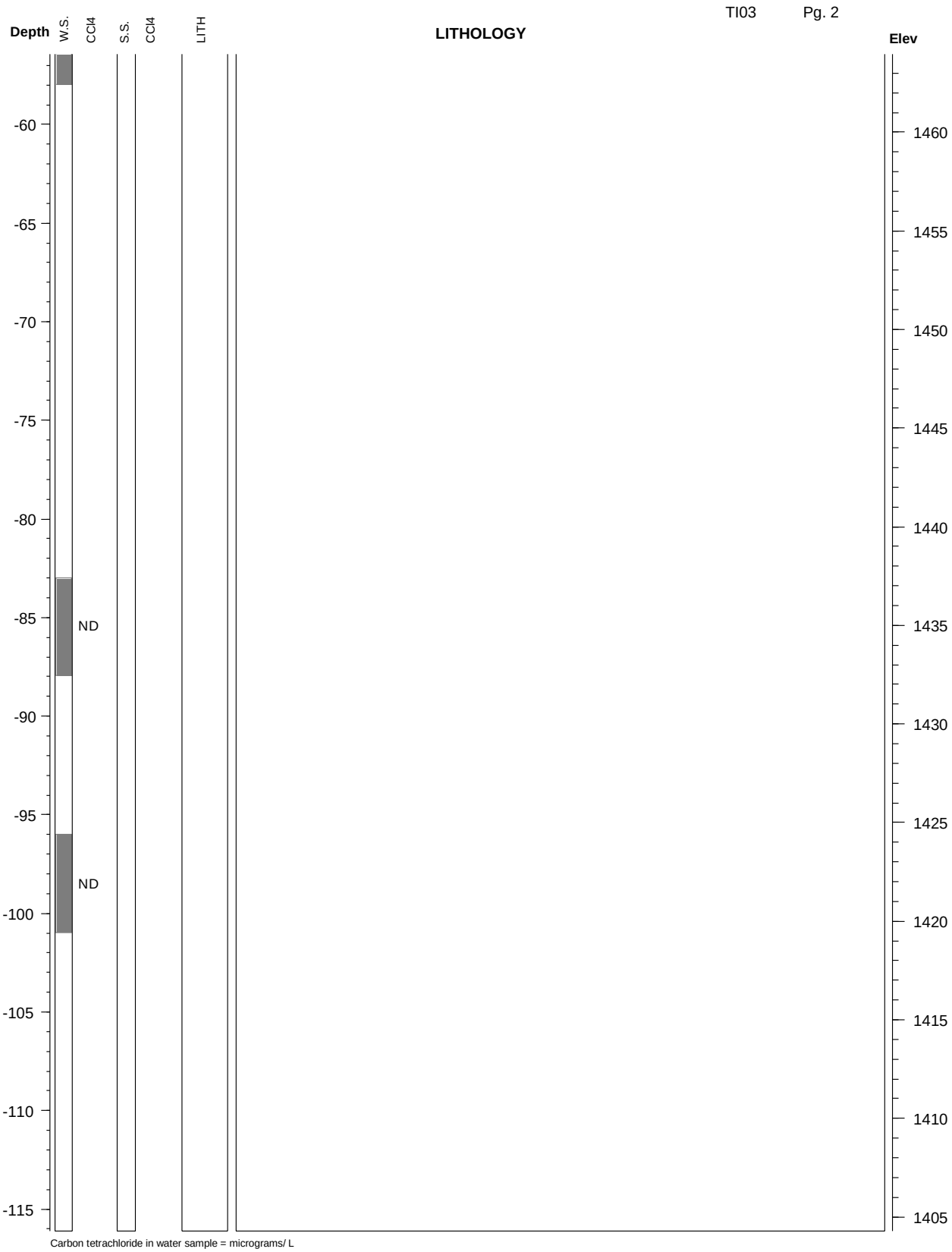
Argonne National Laboratory

Boring ID: TI03

Project: Hilton, KS
Elevation: 1520.4 ft
Geologist: Eugene Yan
Depth: 116.1 ft BGL
Log Date: June 25-26, 2007



Carbon tetrachloride in water sample = micrograms/ L
Carbon tetrachloride in soil sample = micrograms/kg

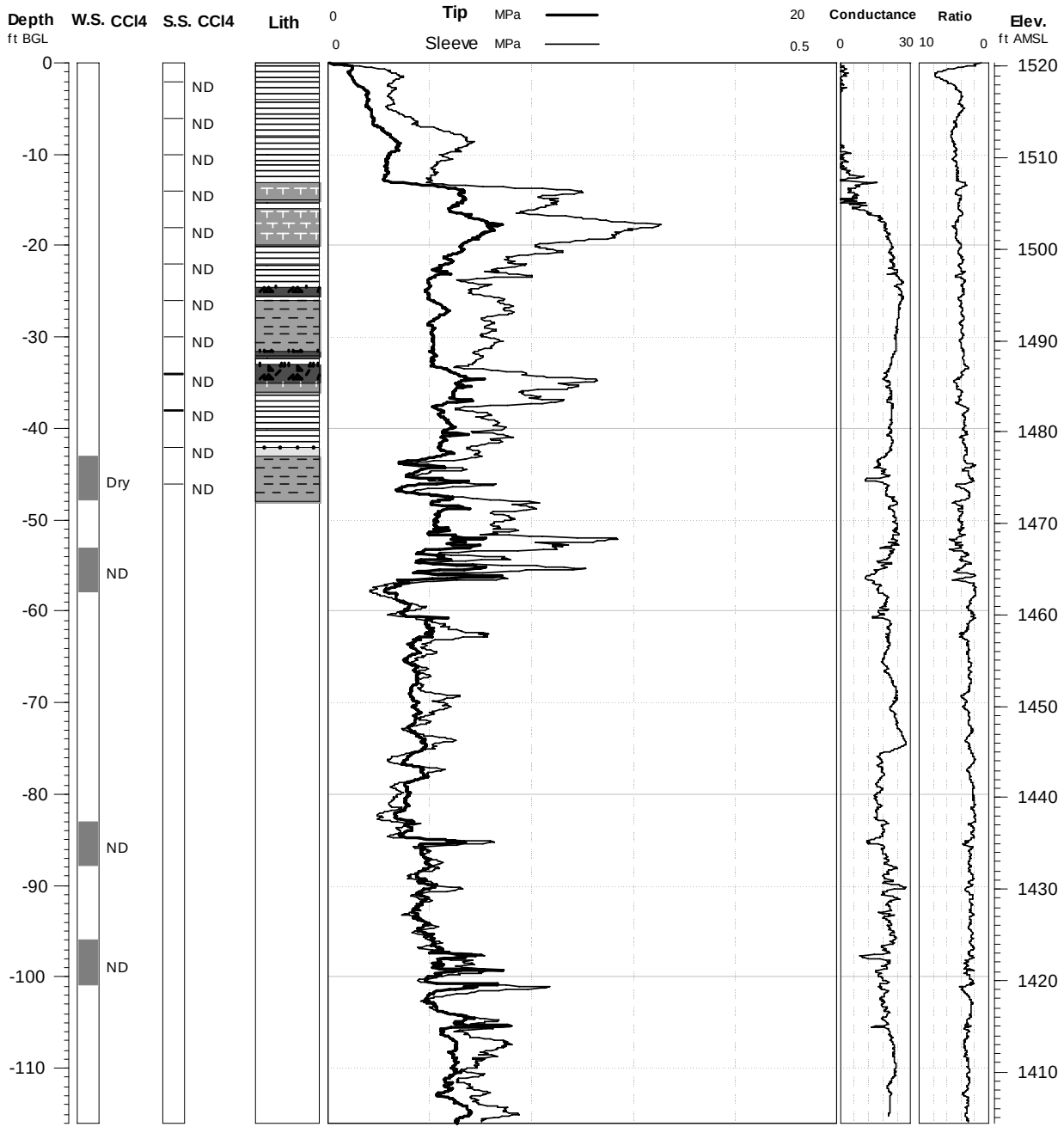

TI03 Pg. 2
Depth
W.S.
CCl4
S.S.
CCl4
LITH
LITHOLOGY
Elev
-60
-65
-70
-75
-80
-85
-90
-95
-100
-105
-110
-115
ND
ND
1460
1455
1450
1445
1440
1435
1430
1425
1420
1415
1410
1405
Carbon tetrachloride in water sample = micrograms/ L

Argonne National Laboratory

Boring ID: TI03

Project: Hilton, KS **Elevation:** 1520.4 ft

Geologist: Eugene Yan **Depth:** 116.1 ft BGL **Log Date:** June 25-26, 2007



Carbon tetrachloride in water sample = micrograms/L
Carbon tetrachloride in soil sample = micrograms/kg

Appendix B:

Activity Log

TABLE B.1 Summary of field activities during the 2007 investigation at Hilton, Kansas.

Sampling Date	Sampling Time	Sample	Medium	Sample Type[a]	Location	Depth (ft BGL)	Chain of Custody	Shipment Date	Log: Page	Sample Description
6/22/07	12:30	HLTB1-W-no sample	Water	CPT	TI01	105.9-110.9	–	–	07-1;5	Screen set from 11:30 to 12:30. No water found.
6/22/07	14:45	HLTB1-W-23760[b]	Water	TB	QC	–	4540	06/22/07	07-1;9	Trip blank sent to the AGEM Laboratory for organic analysis with water sample listed on COC 4540.
6/22/07	17:50	HLTI01-W-23762	Water	CPT	TI01	99.9-104.9	4540	06/22/07	07-1;13	Depth to water = 84.75 ft BGL.
6/23/07	10:10	HLTI01-W-23763	Water	CPT	TI01	83-88	4541	06/25/07	07-1;17	Water entered rods after approximately 10 min. Light brown, milky, silty.
6/23/07	10:20	HLTI01-W-23770[b]	Water	CPT	TI01	83-88	4541	06/25/07	07-1;21	Replicate of sample HLTI01-W-23763.
6/23/07	10:30	HLTI01-W-23771[b]	Water	RI	QC	–	4541	06/25/07	07-1;25	Rinsate of decontaminated sampling bailer after collection of sample HLTI01-W-23763 and replicate HLTI01-W-23770.
6/23/07	11:10	HLTI01-S-23764	Soil	CPT	TI01	3.5	4772	06/25/07	07-1;28	Vertical-profile soil sampling at location TI01 begins.
6/23/07	11:20	HLTI01-S-23765	Soil	CPT	TI01	6	4772	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/23/07	11:30	HLTI01-S-23766	Soil	CPT	TI01	10	4772	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/23/07	11:31	HLTI01-S-23767[b]	Soil	CPT	TI01	10	4772	06/25/07	07-1;28	Replicate of sample HLTI01-S-23766.
6/23/07	11:40	HLTI01-S-23768	Soil	CPT	TI01	14	4772	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/23/07	11:50	HLTI01-S-23769	Soil	CPT	TI01	18	4772	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/23/07	12:05	HLTI01-S-23772	Soil	CPT	TI01	22	4772	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/23/07	14:00	HLTI01-S-23773	Soil	CPT	TI01	26	4772	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/23/07	14:15	HLTI01-S-23774	Soil	CPT	TI01	30	4772	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/23/07	14:30	HLTI01-S-23775	Soil	CPT	TI01	34	4772	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/23/07	14:55	HLTI01-S-23776	Soil	CPT	TI01	38	4772	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/23/07	14:56	HLTI01-S-23777	Soil	CPT	TI01	39.5	4772	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/23/07	15:20	HLTI01-S-23778	Soil	CPT	TI01	42	4769	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/23/07	16:00	HLTI01-S-23779	Soil	CPT	TI01	46	4769	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/23/07	16:20	HLTI01-S-23780	Soil	CPT	TI01	50	4769	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/23/07	17:00	HLTI01-S-23781	Soil	CPT	TI01	54	4769	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/23/07	17:25	HLTI01-S-23782	Soil	CPT	TI01	58	4769	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/23/07	18:00	HLTI01-S-23783	Soil	CPT	TI01	62	4769	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/24/07	8:20	HLTI01-S-23784	Soil	CPT	TI01	65.5	4769	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/24/07	9:00	HLTI01-S-23785	Soil	CPT	TI01	70	4770	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/24/07	9:30	HLTI01-S-23786	Soil	CPT	TI01	74	4770	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/24/07	10:20	HLTI01-S-23787	Soil	CPT	TI01	76.5	4770	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/24/07	11:00	HLTI01-S-23788	Soil	CPT	TI01	82	4770	06/25/07	07-1;28	Vertical-profile soil sampling at TI01.
6/24/07	15:10	HLTI01-W-23789	Water	CPT	TI01	40-50	4541	06/25/07	07-1;33	Water after approximately 2 min.
6/24/07	15:25	HLTB-W-23790[b]	Water	TB	QC	–	4541	06/25/07	07-1;37	Trip blank sent to the AGEM Laboratory for organic analysis with water samples listed on COC 4541.
6/24/07	18:10	HLTI02-W-23791	Water	CPT	TI02	99-104	4541	06/25/07	07-1;41	Water slow, after approximately 15 min.
6/25/07	8:30	HLTB-S-23792[b]	Soil	TB	QC	–	4770	06/25/07	07-1;45	Trip blank sent to the AGEM Laboratory for organic analysis with soil samples listed on COCs 4772, 4769, 4770, and 3764.
6/25/07	13:35	HLTI02-W-23793	Water	CPT	TI02	86-91	4541	06/25/07	07-1;49	Approximately 10 ft of water in rods after 5 hr.

TABLE B.1 (Cont.)

Sampling Date	Sampling Time	Sample	Medium	Sample Type[a]	Location	Depth (ft BGL)	Chain of Custody	Shipment Date	Log: Page	Sample Description
6/25/07	15:10	No sample	Water	CPT	TI03	43-48	–	–	Yan	No water found after 24 hr.
6/25/07	15:30	HLTI03-W-23794	Water	CPT	TI03	96-101	4541	06/25/07	07-1;53	Approximately 10 ft of water in rods after 4 hr.
6/25/07	15:31	HLTI03-W-23795[b]	Water	CPT	TI03	96-101	4541	06/25/07	07-1;57	Replicate of sample HLTI03-W-23794.
6/25/07	15:45	HLTI03-W-23796	Water	CPT	TI03	83-88	4541	06/25/07	07-1;61	No immediate water. Sampled after approximately 3 hr.
6/25/07	16:00	HLTI03-W-23797	Water	CPT	TI03	53-58	4541	06/25/07	07-1;65	No description recorded.
6/25/07	16:15	HLTI03-W-23798[b]	Water	RI	QC	–	4541	06/25/07	07-1;69	Rinsate of decontaminated sampling bailer after collection of sample HLTI03-W-23797.
6/25/07	16:35	HLTI03-S-23799	Soil	CPT	TI03	2	3764	06/25/07	07-1;75	Vertical-profile soil sampling at location TI03 begins.
6/25/07	16:40	HLTI03-S-23800	Soil	CPT	TI03	6	3764	06/25/07	07-1;75	Vertical-profile soil sampling at TI03.
6/25/07	16:50	HLTI03-S-23801	Soil	CPT	TI03	10	3764	06/25/07	07-1;75	Vertical-profile soil sampling at TI03.
6/25/07	17:00	HLTI03-S-23802	Soil	CPT	TI03	14	3764	06/25/07	07-1;75	Vertical-profile soil sampling at TI03.
6/25/07	17:15	HLTI03-S-23803	Soil	CPT	TI03	18	3764	06/25/07	07-1;75	Vertical-profile soil sampling at TI03.
6/25/07	17:30	HLTI03-S-23804	Soil	CPT	TI03	22	3764	06/25/07	07-1;75	Vertical-profile soil sampling at TI03.
6/25/07	17:45	HLTI03-S-23805	Soil	CPT	TI03	26	3764	06/25/07	07-1;75	Vertical-profile soil sampling at TI03.
6/25/07	18:00	HLTI03-S-23806	Soil	CPT	TI03	30	3569	06/26/07	07-1;75	Vertical-profile soil sampling at TI03.
6/25/07	18:20	HLTI03-S-23807	Soil	CPT	TI03	34	3569	06/26/07	07-1;75	Vertical-profile soil sampling at TI03.
6/25/07	18:40	HLTI03-S-23808	Soil	CPT	TI03	38	3569	06/26/07	07-1;75	Vertical-profile soil sampling at TI03.
6/26/07	8:00	HLTI03-S-23809	Soil	CPT	TI03	42	2240	06/26/07	07-1;75	Vertical-profile soil sampling at TI03.
6/26/07	8:30	HLTI03-S-23810	Soil	CPT	TI03	46	2240	06/26/07	07-1;75	Vertical-profile soil sampling at TI03.
6/26/07	10:00	HLTI02-S-23811	Soil	CPT	TI02	2	2240	06/26/07	07-1;79	Vertical-profile soil sampling at location TI02 begins.
6/26/07	10:21	HLTI02-S-23812	Soil	CPT	TI02	6	2240	06/26/07	07-1;79	Vertical-profile soil sampling at TI02.
6/26/07	10:35	HLTI02-S-23814	Soil	CPT	TI02	14	2240	06/26/07	07-1;79	Vertical-profile soil sampling at TI02.
6/26/07	10:48	HLTI02-S-23815	Soil	CPT	TI02	18	2240	06/26/07	07-1;79	Vertical-profile soil sampling at TI02.
6/26/07	11:10	HLTI02-S-23813	Soil	CPT	TI02	10	2240	06/26/07	07-1;79	Vertical-profile soil sampling at TI02.
6/26/07	12:01	HLTI02-S-23816	Soil	CPT	TI02	22	2240	06/26/07	07-1;79	Vertical-profile soil sampling at TI02.
6/26/07	14:33	HLTI02-S-23817	Soil	CPT	TI02	26	2240	06/26/07	07-1;79	Vertical-profile soil sampling at TI02.
6/26/07	14:34	HLTI02-S-23818[b]	Soil	CPT	TI02	26	2240	06/26/07	07-1;79	Replicate of sample HLTI02-S-23817.
6/26/07	14:55	HLTI02-S-23819	Soil	CPT	TI02	30	2240	06/26/07	07-1;79	Vertical-profile soil sampling at TI02.
6/26/07	15:20	HLTI02-S-23820	Soil	CPT	TI02	34	2240	06/26/07	07-1;79	Vertical-profile soil sampling at TI02.
6/26/07	15:40	HLTI02-S-23821	Soil	CPT	TI02	38	2240	06/26/07	07-1;79	Vertical-profile soil sampling at TI02.
6/26/07	16:30	No sample	Water	CPT	TI02	52-57	–	–	Yan	No water found after 24 hr.
6/26/07	17:00	HLTB-S-23823[b]	Soil	TB	QC	–	2240	06/26/07	07-1;79	Trip blank sent to the AGEM Laboratory for organic analysis with soil samples listed on COCs 2240 and 3569.
6/27/07	13:40	HLSB01-W-23824	Water	MW	SB01	144-164	2218	06/28/07	07-1;82	Depth to water from top of casing (TOC) = 78.2 ft. Depth of well = 170.4 ft below TOC. Well diameter = 4 in. Sample collected at low flow after purging of 200 gal at 2 gpm with Redi-Flo pump.

TABLE B.1 (Cont.)

Sampling Date	Sampling Time	Sample	Medium	Sample Type[a]	Location	Depth (ft BGL)	Chain of Custody	Shipment Date	Log: Page	Sample Description
6/28/07	11:41	HLSB07-W-23825	Water	MW	SB07	146.5-166.5	3570	06/28/07	07-1;86	Depth to water from TOC = 76.3 ft. Depth of well = 181.6 ft below TOC. Well diameter = 4 in. Sample collected at low flow after purging of 208 gal at 2 gpm with Redi-Flo pump.
6/28/07	14:20	HLSB06-W-23826	Water	MW	SB06	99-109	3570	06/28/07	07-1;90	Depth to water from TOC = 71.2 ft. Depth of well = 107.70 ft below TOC. Well diameter = 4 in. Sample collected at low flow after purging of 75 gal at 1.5 gpm with Redi-Flo pump.
6/28/07	16:24	HLSB04-W-23827	Water	MW	SB04	130-135	3570	06/28/07	07-1;94	Depth to water from TOC = 68.8 ft. Depth of well = 133.8 ft below TOC. Well diameter = 1 in. Sample collected by using valved tube after purging of 7.5 gal with Waterra pump.
6/28/07	16:48	HLGW01-W-23828	Water	DW	GW01	166	3570	06/28/07	07-1;98	Co-op well. Sample collected at drain in hydrant pressure tank.
6/28/07	16:51	HLGW01-W-23829[b]	Water	DW	GW01	166	3570	06/28/07	07-1;98	Replicate of sample HLGW01-W-23828.
6/28/07	18:00	HLQCTB-W-23830[b]	Water	TB	QC	–	3570	06/28/07	07-1;99	Trip blank sent to the AGEM Laboratory for organic analysis with water samples listed on COCs 3570 and 2218.
7/2/07	14:00	HLTB-W-020707[b]	Water	TB	QC	–	3028	07/02/07	COC	Trip blank sent to Envirosystems, Inc., for verification organic analysis with water samples listed on COC 3028.
7/3/07	10:30	HL-S-MEOHBLANK[b]	Soil	TB	QC	–	3437	07/03/07	COC	Trip blank sent to Severn-Trent Laboratories for verification organic analysis with soil samples listed on COC 3437.
6/29/07	10:45	HLPW-W-23831	Water	BT	QC	–	c	07/02/07	c	Composite sample of wastewater generated during 2007 investigation, sent to Pace Analytical Services, Inc., for organic analysis.
7/10/07	10:00	HLPW-W-23832	Water	BT	QC	–	c	07/12/07	c	Composite sample of wastewater generated during 2007 investigation, sent to Pace Analytical Services, Inc., for nitrate-nitrite nitrogen analysis.
8/1/07	16:00	HL-Hilton	Water	BT	QC	–	c	08/03/07	c	Composite sample of wastewater generated during 2007 investigation, sent to Pace Analytical Services, Inc., for 1,2-dibromoethane (ethylene dibromide) analysis.

[a] Sample types: BT, waste characterization; CPT, cone penetrometer; DW, domestic well; MW, monitoring well; RI, rinsate; TB, trip blank.

[b] Quality control sample.

[c] Personal communication from Lisa Larsen, Larsen and Associates, Inc., on 8/13/07.

Appendix C:

Coordinates Survey Data

TABLE C.1 Coordinates survey data for 2007 investigation at Hilton, Kansas.[a]

	Horizontal Location[b] (ft)		Elevation[c] (ft AMSL)	
Location	Northing	Easting	Ground	Top of Casing
Existing monitoring wells				
SB01	1959458.33	1548521.70	1518.55	1521.03
SB04	1961740.54	1550921.96	1512.80	1512.52
SB06	1959816.82	1547189.33	1516.53	1516.34
SB07	1959828.33	1548541.91	1519.46	1519.22
2007 Cone penetrometer locations				
TI01	1959938.02	1548140.76	1519.74	–
TI02	1960084.93	1548216.14	1520.72	–
TI03	1960258.37	1548141.07	1520.40	–
Private wells				
GW01	1960065.17	1548530.62	1520.55	1517.91
Foster IW[d]	1959858.99	1545665.61	1511.78	1513.04

[a] Coordinates are in the State Plane, Kansas, southern zone.

[b] Horizontal datum is North American Datum (NAD) 83.

[c] Vertical datum is North American Vertical Datum (NAVD) 88.

[d] Foster irrigation well; not sampled.

Appendix D:

Quality Control for Sample Collection, Handling, and Analysis during the Targeted Investigation at Hilton, Kansas

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Quality Control for Sample Collection, Handling, and Analysis during the Targeted Investigation at Hilton, Kansas

Soil and groundwater sampling was conducted in June 2007 at Hilton, Kansas, to complete the scope of work presented in the site-specific *Work Plan* for the Hilton investigation (Argonne 2007). The QA/QC procedures used during the investigation to monitor sample collection, handling, and analysis activities are described in detail in the *Master Work Plan* (Argonne 2002) and the site-specific *Work Plan* (Argonne 2007).

The sections below discuss the quality of the analytical data generated during the Hilton investigation. Evaluation of the organic analytical data was consistent with regulatory guidelines (EPA 1994).

D.1 Sampling to Monitor Sampling Collection, Handling, and Analysis Procedures

Sample collection and handling activities were monitored by the documentation of samples as they were collected and the use of chain-of-custody (COC) forms and custody seals to ensure sample integrity during the handling and shipment of samples for analysis. The QA/QC samples collected included equipment rinsates and trip blanks. Field replicate samples were collected as a measure of analytical precision, and selected soil and groundwater samples were shipped to secondary laboratories for verification organic analysis. Samples were also selected for duplicate analyses. The QA/QC samples are listed in Table D.1. Analytical results for carbon tetrachloride, chloroform, methylene chloride, ethylene dibromide (1,2-dibromoethane), and nitrate-nitrite nitrogen in QA/QC samples collected to monitor sample collection and handling activities are in Table D.2.

D.1.1 Equipment Rinsates

Two equipment rinsates were collected to monitor decontamination procedures for reusable sampling equipment. Contaminants of concern were not detected in the rinsate samples,

indicating that cross-contamination of groundwater samples did not occur during sample collection.

D.1.2 Trip Blanks

As an indicator of cross-contamination of samples during shipment, 7 trip blanks were prepared and placed in the containers with soil or water samples shipped for organic analysis. Included in this total were 3 water trip blanks and 2 soil trip blanks sent to the AGEM Laboratory; 1 water trip blank sent to Envirosystems, Inc.; and 1 soil trip blank sent to Severn-Trent Laboratories (Table D.1). Analytical results, shown in Table D.2, indicate that sample-handling procedures were followed during the 2007 investigation and that cross-contamination of samples did not occur during shipment.

D.1.3 Replicate Samples and Duplicate and Verification Analyses

As an indicator of the consistency of the sampling methodology followed and to provide a measure of analytical precision, replicate soil and groundwater samples were collected. Samples were also selected for duplicate analyses. In addition, selected soil and groundwater samples were submitted for verification organic analysis at a secondary laboratory. Replicate and duplicate samples and samples selected for verification organic analysis are listed in Table D.1.

D.1.4 Waste Characterization Samples

Wastewater generated during investigation activities at Hilton was placed in containers and stored on the site. To determine the appropriate method for disposal, composite samples were collected for analyses for VOCs, ethylene dibromide, and nitrate by Pace Analytical Services, Inc., in Lenexa, Kansas. These samples are identified in Table D.1. On the basis of the analytical results (Table D.2), the wastewater generated during the 2007 investigation was accepted, without treatment, at the Sabetha, Kansas, publicly owned treatment works (Sabetha 2007).

D.2 Quality Control for Organic Analysis of Soil and Water Samples at the AGEM Laboratory

In vertical-profile subsurface soil sampling conducted at 3 locations to investigate site contamination, 44 soil samples were collected. In addition, 2 replicate soil samples were collected for QC purposes. The subsurface soils were analyzed at the AGEM Laboratory for VOCs, including carbon tetrachloride, chloroform, methylene chloride, and ethylene dibromide, by using a modification of EPA Method 8260B (purge-and-trap method), as referenced in the EPA's SW-846 (EPA 2004), to achieve a quantitation limit of 10 µg/kg.

Soil samples were quick-frozen on dry ice as they were collected. At the laboratory, the VOCs present in each sample were extracted with methanol from the sample matrix. For the purge-and-trap soil analyses, an aliquot of the methanol extract was purged, and the volatile species were transferred to a sorbent tube. After purging, the sorbent tube was heated and backflushed with an inert gas to desorb the components into the gas chromatograph-mass spectrometer (GC-MS) system.

Groundwater samples were collected from 4 existing monitoring wells (SB01, SB04, SB06, and SB07) and the private well at the co-op (GW01). At 3 vertical-profile groundwater sampling locations (TI01-TI03), 8 groundwater samples were collected. Replicate samples were collected at 2 of the vertical-profile sampling locations and from the private well at the co-op. In total, 13 groundwater samples (and 3 replicate groundwater samples) were collected for organic analysis at the AGEM Laboratory with EPA Method 524.2 (EPA 2004), to achieve a quantitation limit of 1.0 µg/L.

Water samples shipped to the AGEM Laboratory were analyzed by the purge-and-trap method with a GC-MS system. For the purge-and-trap analyses, the VOCs present in the groundwater sample were extracted (purged) from the sample matrix by bubbling an inert gas through the sample. The purged components were trapped in a sorbent tube. After the purging, the sorbent tube was heated and backflushed with an inert gas to desorb the components into the GC-MS system.

For both the soil and water analyses, the compounds eluting from the GC column were identified by retention time and by comparison with reference library spectra. The concentration of each component was calculated by comparison of the MS response for the quantitation ion to

corresponding calibration curves, the response for internal standards, or both. The internal standard recovery limits were 80-120%. Calibration checks with each sample delivery group (SDG) were required to be within ±20% of the standard.

Samples submitted to the AGEM Laboratory for organic analysis were analyzed in 7 SDGs, as shown in Table D.3. The QA/QC procedures followed included analysis of instrument calibration check standards, analysis of laboratory blanks, monitoring of surrogate spike recovery, and duplicate laboratory analyses. Significant results include the following:

- Samples shipped to the AGEM Laboratory were received with custody seals intact and at the appropriate temperature. All samples were analyzed within required holding times.

- Carbon tetrachloride, chloroform, and ethylene dibromide, contaminants of concern in the investigation, were not detected in laboratory method blanks analyzed with the samples.

- For each SDG, analytical instrument calibration was monitored by the analysis of calibration check standards. Table D.3 shows the relative percent difference (RPD) values between the known and calculated concentrations of the standards. The concentrations of calibration check standards measured in all SDGs were within the acceptable range of ±20%.

- Surrogate standard determinations were performed on samples and blanks by using surrogate spike compounds fluorobenzene, 1,4-dichlorobenzene-d_4, and bromofluorobenzene. Table D.3 shows the percent recovery of each system-monitoring compound for each analysis. The surrogate recoveries were within the specified range of 80-120% for all samples, in either the initial analysis or a successful reanalysis.

- Dual analyses of soil and groundwater samples were conducted at the AGEM Laboratory as a measure of consistency in the sampling and analytical methodologies. Dual analyses were accomplished through the analysis of replicate samples submitted to the laboratory or duplicate analyses of samples selected by the laboratory. Table D.4 summarizes the analytical results for

carbon tetrachloride and chloroform in the primary samples and the associated replicate samples or duplicate analyses. Consistency in both the sampling and analytical methodologies is indicated.

The analytical data from the AGEM Laboratory are acceptable for quantitative determination of contaminant distribution.

D.3 Quality Control for Verification Organic Analysis of Soil Samples by Severn-Trent Laboratories, Inc.

In accordance with the QA/QC procedures defined in the *Master Work Plan* (Argonne 2002), selected soil samples analyzed for VOCs at the AGEM Laboratory with EPA Method 8260B were subjected to verification analysis at a second laboratory with the same analytical procedure. Of the 44 vertical-profile soil samples analyzed by the AGEM Laboratory, 5 samples (11% of the soil samples) were also analyzed by Severn-Trent Laboratories, Inc. The results were reported in 1 SDG. The quality of the organic analytical data from Severn-Trent is discussed below.

The QA/QC procedures followed by Severn-Trent included initial and continuing calibration of instruments, analysis of laboratory blanks, monitoring of surrogate spike recovery, and analyses of laboratory QC samples. Significant results include the following:

- Soil samples shipped to Severn-Trent were received with custody seals intact and at the appropriate temperature. All samples were analyzed within required holding times.

- Carbon tetrachloride and ethylene dibromide, contaminants of concern in the investigation, were not detected in the associated laboratory blanks analyzed with the samples. Two methanol blanks and an instrument blank were analyzed in association with the samples. High concentrations of 2-butanone and 1,1,1-trichloroethane were identified in the analysis of one methanol blank, as were trace concentrations of chloromethane, bromomethane, methyl iodide, chloroform, 1,2,4-trichlorobenzene, naphthalene, and 1,2,3-trichlorobenzene. For comparison, the analysis of the second methanol blank was free of 1,1,1-trichloroethane and chloroform, although trace

concentrations of toluene, *m/p*-xylene, *o*-xylene, 1,4-dichlorobenzene, and 1,2-dibromo-3-chloropropane were identified as constituents. Trace concentrations of methyl iodide, naphthalene, and 1,2,3-trichlorobenzene were identified in the instrument blank.

- Surrogate standard determinations were performed on samples and blanks by using the surrogate spike compounds 1,2-dichloroethane-d_4, toluene-d_8, bromofluorobenzene, and 1,2-dichlorobenzene-d_4. Table D.5 shows the percent recovery of each system-monitoring compound for each analysis. Recovery of surrogate compounds was within the target range for all analyses.

- To evaluate the matrix effect of samples on the analytical methodology, laboratory QC samples containing a suite of compounds at known concentrations, including carbon tetrachloride and chloroform, were analyzed with the SDG. Table D.6 shows the percent recovery of these compounds in the spiked analyses. The QC limits for carbon tetrachloride and chloroform were met.

Analytical results for soil samples analyzed at the AGEM Laboratory with EPA Method 8260B are supported by the analytical results obtained by Severn-Trent with the same analytical method. The verification organic results for contaminants of concern in the soil samples are summarized in Table D.7. No evidence of carbon tetrachloride, chloroform, methylene chloride, or ethylene dibromide contamination was detected in the analyses of soil samples at the AGEM Laboratory. This finding was supported by the verification analyses at Severn-Trent. Trace levels of chloroform detected in 3 of the 5 samples submitted for verification analysis by Severn-Trent were consistent with the chloroform levels present in the methanol used for extraction of those samples.

D.4 Quality Control for Verification Organic Analysis of Groundwater Samples by Envirosystems, Inc.

In accordance with the QA/QC procedures defined in the *Master Work Plan* (Argonne 2002), the analyses of water samples at the AGEM Laboratory with EPA Method 524.2 were verified by a second laboratory with EPA-defined CLP methodology. Of the 16 groundwater samples and replicates analyzed at the AGEM Laboratory, 3 samples (19%) were also analyzed

according to CLP methodology by Envirosystems, Inc. The results were reported in 1 SDG. Below is a discussion of the quality of the organic analytical data obtained with CLP methodology.

The QA/QC procedures followed in the CLP analyses included initial and continuing calibration of instruments, analysis of laboratory blanks, and monitoring of surrogate spike recovery. Significant results include the following:

- Samples shipped to the CLP laboratory were received with custody seals intact and at the appropriate temperature. All samples were analyzed within required holding times.

- Analytical instruments were properly tuned; initial and continuing calibration checks remained within the allowable range for all contaminants of interest.

- Contamination was not detected in the associated laboratory method blank.

- Surrogate standard determinations were performed on samples and blanks by using the surrogate spike compounds toluene-d_8, bromofluorobenzene, and 1,2-dichloroethane-d_4. Table D.8 shows the percent recovery of each system-monitoring compound for each of the CLP analyses. With one exception, the recoveries of the surrogate spikes were within the acceptable range (identified in Table D.8) specific to each surrogate. Marginally low recovery of 2 of the 3 surrogate compounds in the verification analysis of sample HLTI02-W-23791 does not warrant qualification of the data.

Analytical results for groundwater samples analyzed at the AGEM Laboratory with EPA Method 524.2 are supported by the analytical results from Envirosystems, Inc., obtained by using EPA CLP methodology. The verification organic results in the groundwater samples are summarized in Table D.9. The significant findings are as follows:

- Analyses at the AGEM Laboratory gave no evidence for VOCs contamination associated with past grain fumigation activities in groundwater samples collected from the 4 existing monitoring wells or in vertical-profile groundwater samples collected at 3 locations within the former CCC/USDA

grain storage facility. This finding was supported in the verification analyses of 2 vertical-profile groundwater samples by Envirosystems.

- Carbon tetrachloride contamination at a high concentration was detected in groundwater from private well GW01, located on the co-op property, as evidenced by the analyses of sample HLGW01-W-23828 by the AGEM Laboratory and sample replicate HLGW01-W-23829 by Envirosystems. The AGEM Laboratory reported a concentration of 905 µg/L for the primary sample, in analysis at 10-fold dilution, while Envirosystems reported a concentration of 1,100 µg/L in analysis of the sample replicate at 50-fold dilution, for an RPD value of 19.4%. Similar consistency in the chloroform results are evident, with concentrations of 39 µg/L reported by the AGEM Laboratory and 45 µg/L reported by Envirosystems, for an RPD value of 14.3%.

- Low concentrations of methylene chloride and ethylene dibromide detected in the sample from the co-op well by the AGEM Laboratory were also supported by the Envirosystems verification analysis. Methylene chloride is a degradation product of fumigant compound carbon tetrachloride, and ethylene dibromide is a fumigant compound historically detected in the co-op well.

- The trace detection of acetone, a common laboratory contaminant, in vertical-profile groundwater sample HLTI02-W-23791 at a concentration below the quantitation limit is likely the result of laboratory contamination, even though the compound was not detected in the blank analyzed with the samples.

D.5 Quality Control for Organic and Nitrate-Nitrite Nitrogen Analyses of Waste Characterization Samples by Pace Analytical Services, Inc.

Wastewater samples were analyzed by Pace Analytical Services, according to the following methods:

- VOCs analyses: EPA Method 8260

- 1,2-Dibromoethane (ethylene dibromide) analyses: EPA Method 504.1

- Nitrate-nitrite nitrogen analyses: EPA Method 353.2

The associated method blanks were free of contamination. The recoveries of the contaminants of concern in laboratory QC samples were within specified method limits. The analytical results are in Table D.2.

TABLE D.1 Quality control samples collected to monitor sample collection, handling, and analysis activities during the targeted investigation at Hilton, Kansas.

Location	Sample	Depth (ft BGL)	Sampling Date	Medium	Sample Description
Equipment rinsates					
QC	HLTI01-W-23771	–	6/23/07	Water	Rinsate of decontaminated sampling bailer after collection of sample HLTI01-W-23763 and replicate HLTI01-W-23770.
QC	HLTI03-W-23798	–	6/25/07	Water	Rinsate of decontaminated sampling bailer after collection of sample HLTI03-W-23797.
Trip blanks					
QC	HLTB1-W-23760	–	6/22/07	Water	Trip blank sent to the AGEM Laboratory for organic analysis with water sample listed on COC 4540.
QC	HLTB-W-23790	–	6/24/07	Water	Trip blank sent to the AGEM Laboratory for organic analysis with water sample listed on COC 4541.
QC	HLTB-S-23792	–	6/25/07	Soil	Trip blank sent to the AGEM Laboratory for organic analysis with soil samples listed on COCs 4772, 4769, 4770 and 3764.
QC	HLTB-S-23823	–	6/26/07	Soil	Trip blank sent to the AGEM Laboratory for organic analysis with soil samples listed on COCs 2240 and 3569.
QC	HLQCTB-W-23830	–	6/28/07	Water	Trip blank sent to the AGEM Laboratory for organic analysis with water samples listed on COCs 3570 and 2218.
QC	HLTB-W-020707	–	7/2/07	Water	Trip blank sent to Envirosystems, Inc., for verification organic analysis lwith water samples isted on COC 3028.
QC	HL-S-MEOHBLANK	–	7/3/07	Soil	Trip blank sent to Severn-Trent Laboratories for verification organic analysis with soil samples listed on COC 3437.
Replicate samples					
GW01	HLGW01-W-23829	166[a]	6/28/07	Water	Replicate of co-op well sample HLGW01-W-23828.
TI01	HLTI01-S-23767	10	6/23/07	Soil	Replicate of vertical-profile subsurface soil sample HLTI01-S-23766.
TI01	HLTI01-W-23770	83-88	6/23/07	Water	Replicate of vertical-profile groundwater sample HLTI01-W-23763.
TI02	HLTI02-S-23818	26	6/26/07	Soil	Replicate of vertical-profile subsurface soil sample HLTI02-S-23817.
TI03	HLTI03-W-23795	96-101	6/25/07	Water	Replicate of vertical-profile groundwater sample HLTI03-W-23794.
Samples selected by the AGEM Laboratory for duplicate organic analyses					
TI01	HLTI01-S-23772	22	6/23/07	Soil	Vertical-profile subsurface soil sample.
TI01	HLTI01-S-23781	54	6/23/07	Soil	Vertical-profile subsurface soil sample.
TI01	HLTI01-W-23762	99.9-104.9	6/22/07	Water	Vertical-profile groundwater sample.

TABLE D.1 (Cont.)

Location	Sample	Depth (ft BGL)	Sampling Date	Medium	Sample Description
Samples selected by the AGEM Laboratory for duplicate organic analyses (cont.)					
TI02	HLTI02-S-23819	30	6/26/07	Soil	Vertical-profile subsurface soil sample.
TI03	HLTI03-W-23795	96-101	6/25/07	Water	Vertical-profile groundwater sample.
Soil samples selected for verification organic analysis by Severn-Trent Laboratories					
TI01	HLTI01-S-23772	22	6/23/07	Soil	Vertical-profile subsurface soil sample.
TI01	HLTI01-S-23782	58	6/23/07	Soil	Vertical-profile subsurface soil sample.
TI01	HLTI01-S-23785	70	6/24/07	Soil	Vertical-profile subsurface soil sample.
TI02	HLTI02-S-23814	14	6/26/07	Soil	Vertical-profile subsurface soil sample.
TI03	HLTI03-S-23810	46	6/26/07	Soil	Vertical-profile subsurface soil sample.
Groundwater samples selected for verification organic analysis by Envirosystems, Inc.					
GW01	HLGW01-W-23829	166[a]	6/28/07	Water	Replicate of co-op well GW01 sample HLGW01-W-23828.
TI02	HLTI02-W-23791	99-104	6/24/07	Water	Cone penetrometer push sample. Water slow, after approximately 15 min.
TI03	HLTI03-W-23795	96-101	6/25/07	Water	Replicate of cone penetrometer push sample HLTI03-W-23794.
Waste characterization samples submitted for organic and nitrate-nitrite nitrogen analyses by Pace Analytical Services, Inc.					
QC	HLPW-W-23831	–	6/29/07	Water	Composite sample of wastewater generated during the 2007 investigation, for organic analysis.
QC	HLPW-W-23832	–	7/10/07	Water	Composite sample of wastewater generated during 2007 investigation, for nitrate-nitrite nitrogen analysis.
QC	HL-Hilton	–	8/1/07	Water	Composite sample of wastewater generated during 2007 investigation, for 1,2-dibromoethane (ethylene dibromide) analysis.

[a] Total depth of well.

TABLE D.2 Analytical results for quality control samples used to monitor sample collection and handling activites during the targeted investigation at Hilton, Kansas.

Sample	Sampling Date	Medium	Analysis Date	EPA Analytical Method	Laboratory[a]	Concentration						
						Carbon Tetrachloride	Chloroform	Methylene Chloride	Ethylene Dibromide	Nitrate-Nitrite Nitrogen	Quantitation Limit	Units
Equipment rinsates												
HLTI01-W-23771	6/23/07	Water	6/26/07	524.2	AGEM	ND[b]	ND	ND	ND	–	1.0	µg/L
HLTI03-W-23798	6/25/07	Water	6/26/07	524.2	AGEM	ND	ND	ND	ND	–	1.0	µg/L
Trip blanks												
HLTB1-W-23760	6/22/07	Water	6/25/07	524.2	AGEM	ND	ND	ND	ND	–	1.0	µg/L
HLTB-W-23790	6/24/07	Water	6/26/07	524.2	AGEM	ND	ND	ND	ND	–	1.0	µg/L
HLTB-S-23792	6/25/07	Soil	6/29/07	SW8260B	AGEM	ND	ND	ND	ND	–	10	µg/kg
HLTB-S-23823	6/26/07	Soil	7/2/07	SW8260B	AGEM	ND	ND	ND	ND	–	10	µg/kg
HLQCTB-W-23830	6/28/07	Water	6/29/07	524.2	AGEM	ND	ND	ND	ND	–	1.0	µg/L
HLTB-W-020707	7/2/07	Water	7/3/07	SW8260	ENVSYS	ND	ND	ND	ND	–	5.0	µg/L
HL-S-MEOHBLANK	7/3/07	Soil	7/16/07	SW8260B	STL	ND	8.1 J[c]	ND	ND	–	10	µg/kg
Waste characterization samples												
HLPW-W-23831	6/29/07	Water	07/04/07	SW8260	PAS	ND	ND	ND	ND	–	1.0	µg/L
HLPW-W-23832	7/10/07	Water	07/20/07	353.2	PAS	–	–	–	–	1.0	0.1	mg/L
HL-Hilton	8/1/07	Water	08/03/07	504.1	PAS	–	–	–	ND	–	0.028	µg/L

[a] Laboratories: AGEM; Applied Geosciences and Environmental Management, Argonne; ENVSYS, Envirosystems, Inc.; PAS, Pace Analytical Services, Inc.; STL, Severn-Trent Laboratories.

[b] ND, contaminant not detected.

[c] Qualifier J indicates an estimated concentration below the indicated quantitation limit.

TABLE D.3 Calibration and surrogate recovery results during organic analyses of soil and water samples at the AGEM Laboratory.

	Recovery of Surrogate Compounds[a] (%)			Results for Calibration Check Standards[b]					
				Carbon Tetrachloride		Chloroform		Methylene Chloride	
Sample	Fluoro-benzene	Bromo-fluorobenzene	Dichloro-benzene-d_4	ppb	RPD[a]	ppb	RPD[a]	ppb	RPD[a]
SDG 07-6-25, analysis date June 25, 2007									
20-ppb standard	96	93	99	20.1	0.1	21.2	1.5	16.42	4.9
Laboratory blank	100	100	100						
HLTI01-W-23762	89	87	96						
HLTI01-W-23762DUP	97	96	103						
HLTB1-W-23760	99	99	101						
SDG 07-6-26, analysis date June 26, 2007									
20-ppb standard	105	112	112	21.55	1.9	21.78	2.1	16.19	5.3
Laboratory blank	100	100	100						
HLTI01-W-23789	87	88	86						
HLTI01-W-23763	101	102	102						
HLTI03-W-23796	98	102	106						
HLTI02-W-23791	97	98	101						
HLTI03-W-23794	103	97	102						
HLTI02-W-23793	98	96	103						
HLTI03-W-23797	97	97	102						
HLTI03-W-23795	95	97	97						
HLTI03-W-23795DUP	93	93	93						
HLTI01-W-23770	92	91	90						
HLTI03-W-23798	89	86	85						
HLTI01-W-23771	87	83	83						
HLTB-W-23790	94	83	85						
SDG 07-6-27, analysis date June 27, 2007									
20-ppb standard	101	101	101	22.19	2.6	22.87	3.3	16.13	5.4
Methanol blank	89	93	93						
HLTI01-S-23766	98	95	100						
HLTI01-S-23773	95	92	99						
HLTI01-S-23775	102	92	101						
HLTI01-S-23777	101	101	110						

TABLE D.3 (Cont.)

Sample	Recovery of Surrogate Compounds[a] (%)			Results for Calibration Check Standards[b]					
				Carbon Tetrachloride		Chloroform		Methylene Chloride	
	Fluoro-benzene	Bromo-fluorobenzene	Dichloro-benzene-d_4	ppb	RPD[a]	ppb	RPD[a]	ppb	RPD[a]
SDG 07-6-27, analysis date June 27, 2007 (cont.)									
HLTI01-S-23769	99	99	109						
HLTI03-S-23803	99	99	108						
HLTI03-S-23804	95	97	105						
HLTI03-S-23801	96	94	101						
HLTI01-S-23774	96	99	101						
HLTI01-S-23772	96	91	97						
HLTI01-S-23772DUP	98	94	96						
Methanol blank 2	100	100	100						
HLTI01-S-23764	98	97	100						
HLTI01-S-23776	101	107	108						
HLTI01-S-23765	96	90	98						
HLTI03-S-23805	96	95	98						
SDG 07-6-28, analysis date June 28, 2007									
20-ppb standard	99	109	117	19.13	1.1	19.3	0.9	14.84	7.4
Methanol blank	100	100	100						
HLTI03-S-23799	96	96	102						
HLTI03-S-23802	104	101	106						
HLTI01-S-23767	100	101	103						
HLTI01-S-23768	95	99	102						
HLTI03-S-23800	94	98	94						
HLTI01-S-23785	93	93	94						
HLTI01-S-23787	94	91	90						
HLTI01-S-23786	89	91	91						
HLTI01-S-23778	93	94	95						
HLTI01-S-23779	88	84	86						
HLTI01-S-23788	89	88	89						
HLTI01-S-23781	94	93	92						
HLTI01-S-23781DUP	90	87	90						
Methanol blank 2	91	87	85						
HLTI01-S-23783	89	90	90						

TABLE D.3 (Cont.)

Sample	Recovery of Surrogate Compounds[a] (%)			Results for Calibration Check Standards[b]					
				Carbon Tetrachloride		Chloroform		Methylene Chloride	
	Fluoro-benzene	Bromo-fluorobenzene	Dichloro-benzene-d_4	ppb	RPD[a]	ppb	RPD[a]	ppb	RPD[a]
SDG 07-6-29a, analysis date June 29, 2007									
20-ppb standard	100	100	100	19.91	0.1	18.93	1.4	19.74	0.3
Methanol blank	90	100	99						
HLTI01-S-23780	87	99	102						
HLTI01-S-23784	91	117	119						
HLTI01-S-23782	87	102	103						
HLTB-S-23792	89	102	98						
HLTI02-S-23815	89	106	104						
HLTI02-S-23820	84	102	105						
HLTI03-S-23807	87	107	105						
HLTI03-S-23809	86	105	107						
HLTI02-S-23817	120	116	123[c]	Reanalyzed in SDG 07-7-2 with recovery limits met.					
HLTI02-S-23813	103	100	105						
HLTI02-S-23811	114	105	108						
HLTI03-S-23808	105	105	108						
HLTI03-S-23806	106	98	100						
SDG 07-6-29b, analysis date June 29, 2007									
20-ppb standard	98	98	96	18.09	2.5	19.62	0.5	20.67	0.8
Laboratory blank	100	100	100						
HLGW01-W-23829	88	85	88	Outside calibration range for carbon tetrachloride at zero dilution (at dilution factor [DF] 1). Methylene chloride and ethylene dibromide reported.					
HLSB06-W-23826	98	100	104						
HLSB01-W-23824	97	97	99						
HLSB04-W-23827	96	96	97						
HLGW01-W-23828	94	96	97	Outside calibration range for carbon tetrachloride at DF 1. Methylene chloride and ethylene dibromide reported.					
HLSB07-W-23825	96	101	103						
HLQCTB-W-23830	94	94	95						
Laboratory blank 2	91	92	95						

TABLE D.3 (Cont.)

Sample	Recovery of Surrogate Compounds[a] (%)			Results for Calibration Check Standards[b]					
				Carbon Tetrachloride		Chloroform		Methylene Chloride	
	Fluoro-benzene	Bromo-fluorobenzene	Dichloro-benzene-d_4	ppb	RPD[a]	ppb	RPD[a]	ppb	RPD[a]
SDG 07-6-29b, analysis date June 29, 2007 (cont.)									
HLGW01-W-23829	113	100	100	Analysis at DF 10 for carbon tetrachloride and chloroform.					
HLGW01-W-23828	100	90	92	Analysis at DF 10 for carbon tetrachloride and chloroform.					
SDG 07-7-2, analysis date July 2, 2007									
20-ppb standard	100	100	100	22.92	3.4	22.22	2.6	17.16	3.8
Methanol blank	100	100	100						
HLTI03-S-23810	111	107	108						
HLTI02-S-23812	111	108	113						
HLTI02-S-23818	114	107	111						
HLTI02-S-23816	108	104	109						
HLTI02-S-23819	106	107	106						
HLTI02-S-23819DUP	107	103	104						
HLTI02-S-23821	104	102	104						
HLTI02-S-23814	106	98	102						
HLTI02-S-23817	102	99	98						
HLTB-S-23823	96	94	98						

[a] Quality control limits:
Recovery of surrogate compounds: 80-120%
Calibration check standard RPD: ±20%

[b] Concentrations are given in parts per billion (ppb; µg/L in water or µg/kg in soil).

[c] Surrogate recovery outside QC limits.

TABLE D.4 Results for secondary organic analyses of soil and water samples by the AGEM Laboratory.

Medium	Sample Type[a]	Location	Depth (ft BGL)	Sampling Date	Sample	Sample Description	Analysis Date	Concentration				
								Carbon Tetrachloride	Chloroform	Methylene Chloride	Ethylene Dibromide	Units
Water	DW	GW01	166[b]	6/28/07	HLGW01-W-23828	Primary sample	6/29/07	903	37	1.4	3.2	µg/L
					HLGW01-W-23829	Replicate sample	6/29/07	905	39	1.4	3.2	µg/L
Soil	CPT	TI01	10	6/23/07	HLTI01-S-23766	Primary sample	6/27/07	ND[c]	ND	ND	ND	µg/kg
					HLTI01-S-23767	Replicate sample	6/28/07	ND	ND	ND	ND	µg/kg
Soil	CPT	TI01	22	6/23/07	HLTI01-S-23772	Primary sample	6/27/07	ND	ND	ND	ND	µg/kg
					HLTI01-S-23772DUP	Duplicate analysis	6/27/07	ND	ND	ND	ND	µg/kg
Soil	CPT	TI01	54	6/23/07	HLTI01-S-23781	Primary sample	6/28/07	ND	ND	ND	ND	µg/kg
					HLTI01-S-23781DUP	Duplicate analysis	6/28/07	ND	ND	ND	ND	µg/kg
Water	CPT	TI01	83-88	6/23/07	HLTI01-W-23763	Primary sample	6/26/07	ND	ND	ND	ND	µg/L
					HLTI01-W-23770	Replicate sample	6/26/07	ND	ND	ND	ND	µg/L
Water	CPT	TI01	99.9-104.9	6/22/07	HLTI01-W-23762	Primary sample	6/25/07	ND	ND	ND	ND	µg/L
					HLTI01-W-23762DUP	Duplicate analysis	6/25/07	ND	ND	ND	ND	µg/L
Soil	CPT	TI02	26	6/26/07	HLTI02-S-23817	Primary sample	7/2/07	ND	ND	ND	ND	µg/kg
					HLTI02-S-23818	Replicate sample	7/2/07	ND	ND	ND	ND	µg/kg
Soil	CPT	TI02	30	6/26/07	HLTI02-S-23819	Primary sample	7/2/07	ND	ND	ND	ND	µg/kg
					HLTI02-S-23819DUP	Duplicate analysis	7/2/07	ND	ND	ND	ND	µg/kg
Water	CPT	TI03	96-101	6/25/07	HLTI03-W-23794	Primary sample	6/26/07	ND	ND	ND	ND	µg/L
					HLTI03-W-23795	Replicate sample	6/26/07	ND	ND	ND	ND	µg/L
					HLTI03-W-23795DUP	Duplicate analysis	6/26/07	ND	ND	ND	ND	µg/L

[a] Sample types: CPT, cone penetrometer; DW, domestic well.

[b] Total depth of well.

[c] ND, contaminant not detected at instrument detection limit of 0.1 µg/L for water samples or 1.0 µg/kg for soil samples.

TABLE D.5 Recovery of system-monitoring compounds in verification organic analyses of soil samples by Severn-Trent Laboratories with EPA Method 8260B.

Sample	Analysis Date	Sample Delivery Group	Recovery[a] (%) 1,2-Dichloroethane-d_4	Toluene-d_8	Bromofluorobenzene	Dichlorobenzene-d_4
MEOH071607LCS	7/16/07	120797	106	98	99	102
HLTI01-S-23785	7/16/07	120797	93	92	102	91
HLTI01-S-23772	7/16/07	120797	99	107	113	100
HLTI01-S-23782	7/16/07	120797	90	94	98	92
HLTI03-S-23810	7/16/07	120797	85	89	91	92
HLTI02-S-23814	7/16/07	120797	88	96	96	102
HL-S-MEOHBLANK (1)	7/16/07	120797	80	91	88	95
HL-S-MEOHBLANK (2)	7/16/07	120797	83	90	89	99
LA071607LCS	7/16/07	120797	94	98	103	102
MBLK071607LA	7/16/07	120797	95	99	103	96

[a] Quality control ranges for recovery:

Compound	Range (%)
1,2-Dichloroethane-d_4	80-125
Toluene-d_8	85-115
Bromofluorobenzene	85-120
1,2-Dichlorobenzene-d_4	80-125

TABLE D.6 Recovery of contaminants of concern in laboratory quality control samples used during verification organic analysis of soil samples by Severn-Trent Laboratories.

			Carbon Tetrachloride			Chloroform		
Sample	Analysis Date	Sample Delivery Group	Spiked Concentration (ppb)	Detected Concentration (ppb)	Recovery[a] (%)	Spiked Concentration (ppb)	Detected Concentration (ppb)	Recovery[a] (%)
MEOH071607LCS	7/16/07	120797	200	180	90	200	180	90
LA071607LCS	7/16/07	120797	10.0	9.7	97	10.0	10.0	100

[a] Quality control ranges for recovery:

Compound	Range (%)
Carbon tetrachloride	80-115
Chloroform	80-115

TABLE D.7 Results for verification organic analyses of soil samples.

				Concentration (µg/kg)							
				AGEM Laboratory				Severn-Trent Laboratories			
Location	Sample	Depth (ft BGL)	Sampling Date	Carbon Tetrachloride	Chloroform	Methylene Chloride	Ethylene Dibromide	Carbon Tetrachloride	Chloroform	Methylene Chloride	Ethylene Dibromide
TI01	HLTI01-S-23772	22	6/23/07	ND[a]	ND	ND	ND	ND	24 B[b]	ND	ND
TI01	HLTI01-S-23782	58	6/23/07	ND	ND	ND	ND	ND	23 B	ND	ND
TI01	HLTI01-S-23785	70	6/24/07	ND	ND	ND	ND	ND	20 B	ND	ND
TI02	HLTI02-S-23814	14	6/26/07	ND	ND	ND	ND	ND	ND	ND	ND
TI03	HLTI03-S-23810	46	6/26/07	ND	ND	ND	ND	ND	ND	ND	ND

[a] NC, contaminant not detected at the method detection limit of 1.0 µg/kg.

[b] Qualifier B indicates that the contaminant was present in the associated blank.

TABLE D.8 Recovery of system-monitoring compounds in verification organic analyses of water samples by Envirosystems, Inc.

Sample	Analysis Date	Sample Delivery Group	Recovery[a] (%) Toluene-d_8	Bromofluoro-benzene	1,2-Dichloro-ethane-d_4
HLGW01-W-23829	7/3/07	0702510	97	93	102
HLGW01-W-23829DL	7/3/07	0702510	99	92	110
HLTB-W-020707	7/3/07	0702510	96	91	103
HLTI02-W-23791	7/3/07	0702510	86[b]	80[b]	96
HLTI03-W-23795	7/3/07	0702510	103	97	111
VBLKHT	7/3/07	0702510	105	96	106

[a] Quality control ranges for recovery:

Compound	Range (%)
Toluene-d_8	88-110
Bromofluorobenzene	86-115
1,2-Dichloroethane-d_4	76-114

[b] Recovery outside QC limits.

TABLE D.9 Results for verification organic analyses of groundwater samples.

				Concentration (µg/L)								Relative Percent Difference			
				AGEM Laboratory				Envirosystems							
Location	Sample	Depth (ft BGL)	Sampling Date	Carbon Tetrachloride	Chloroform	Methylene Chloride	Ethylene Dibromide	Carbon Tetrachloride	Chloroform	Methylene Chloride	Ethylene Dibromide	Carbon Tetrachloride	Chloroform	Methylene Chloride	Ethylene Dibromide
GW01	HLGW01-W-23828/ HLGW01-W-23829[a]	166	6/28/07	905	39	1.4	3.2	1100	45	1 J[b]	7.5	19.4	14.3	33	80
TI02	HLTI02-W-23791	99-104	6/24/07	ND[c]	ND	ND	ND	ND	ND	ND	ND	–	–	–	–
TI03	HLTI03-W-23795	96-101	6/25/07	ND	ND	ND	ND	ND	ND	ND	ND	–	–	–	–

[a] Analysis at the AGEM Laboratory was conducted on sample HLGW01-W-23828 at dilution factor (DF) 10 for all contaminants. Analysis of the replicate sample (HLGW01-W-23829) by Envirosystems was conducted at DF 50 for carbon tetrachloride and DF 1 for the remaining contaminants.

[b] Qualifier J indicates an estimated concentration below the CLP method quantitation limit of 5.0 µg/L.

[c] ND, contaminant not detected at instrument detection limit of 0.1 µg/L for analyses at the AGEM Laboratory or 1.0 µg/L for CLP analyses by Envirosystems.

Appendix E:

Outside Laboratory Data

Soil Verification Analyses by
Severn-Trent Laboratories, Inc.

July 20, 2007

STL

STL Burlington
30 Community Drive, Suite 11
South Burlington, VT 05403

Tel: 802 660 1990 Fax: 802 660 1919
www.stl-inc.com

Mr. Clyde Dennis
Argonne National Laboratory
9700 S. Cass Avenue
Building 203, Office 149
Argonne, IL 60439

Re: Laboratory Project No. 21005
Case: BARNES; SDG: 120797

Enclosed are analytical results for samples that were received by STL Burlington on July 7th, 2007. Laboratory identification numbers were assigned, and designated as follows:

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 07/07/07 ETR No: 120797		
716821	HL-S-23785 (20A)	07/02/07	LIQUID
716822	HL-S-23772 (10A)	07/02/07	LIQUID
716823	HL-S-23782 (30A)	07/02/07	LIQUID
716824	HL-S-23810 (10A)	07/02/07	LIQUID
716825	HL-S-23814 (16A)	07/02/07	LIQUID
716826	HL-S-MEOH BLANK (1)	07/02/07	LIQUID
716827	HL-S-MEOH BLANK (2)	07/02/07	LIQUID

Documentation of the condition of the samples at the time of their receipt and any exception to the laboratory's Sample Acceptance Policy is documented in the Sample Handling section of this submittal. In order to accommodate field length limitations in processing the data summary forms, the laboratory did, in certain instances, abbreviate the sample identifier. The electronically formatted data provides for the full sample identifier.

The samples were analyzed by Method 8260B, using a low-level calibration. In performing the analytical work, 500 microliters of the methanol extract were added to the 5 milliliter purge volume. With the exception of that performed on samples HL-S-23810 (10A), HL-S-23814 (16A), HL-S-MEOH BLANK (1) and HL-S-MEOH BLANK (2), each of the analyses associated with the sample set did exhibit an acceptable internal standard performance. The internal standard responses in the referenced samples did exceed the upper limit. The cumulative affect of the higher amount of methanol in performing the analytical work likely contributed to the high responses in those analyses. A follow-up analysis of the samples was not preformed due to limitations on sample volume. The surrogate controls were recovered well in each of the analyses associated with the sample set. Two types of laboratory control sample analyses were performed in the course of the analytical work. One was performed to evaluate method performance, and one was performed with 500 microliters of methanol added to the purge volume in order to characterize the affect on the analytical process. In general, the target analytes were recovered well in the laboratory control sample analysis that defined method performance, although the recovery of methyl iodide was elevated in that analysis (140 percent). In the laboratory control sample analysis with methanol, several of the earlier eluting compounds

did exhibit lower a recovery performance, as did isobutyl alcohol. Most profoundly affected was the performance of isobutyl alcohol, for which the derived recovery value approximated 19 percent. Chloroform and carbon tetrachloride were recovered well in each of the laboratory control sample analyses. Matrix spike and matrix spike duplicate analyses were not performed on samples in this sample set. High concentrations of 2-butanone and 1,1,1-trichloroethane were identified in the analysis of HL-S-MEOH BLANK (1), as were trace concentrations of chloromethane, bromomethane, methyl iodide, chloroform, 1,2,4-trichlorobenzene, naphthalene, and 1,2,3-trichlorobenzene. By comparison, the analysis of HL-S-MEOH BLANK (2) was free of 1,1,1-trichloroethane and chloroform, although trace concentrations of toluene, m&p-xylene, o-xylene, 1,4-dichlorobenzene, and 1,2-dibromo-3-chloropropane were additionally identified as constituents. The laboratory did associate the analysis of HL-S-MEOH BLANK (1) with the analysis of each of the field samples in order to reference the blank association, and accordingly qualify the reported results. The laboratory did not attempt to relate samples to one or the other of the methanol blanks based on the results. HL-S-MEOH BLANK (1) was used preferentially due to the presence of chloroform as a constituent. Trace concentrations of methyl iodide, naphthalene and 1,2,3-trichlorobenzene were identified in the analysis of the instrument blank that was analyzed in association with the samples.

The analytical results associated with the samples presented in this test report were generated under a quality system that adheres to requirements specified in the NELAC standard. Release of the data in this test report and any associated electronic deliverables is authorized by the Laboratory Director's designee as verified by the following signature.

If there are any questions regarding this submittal, please contact me at 802 660-1990.

Sincerely,

Kirk F. Young
Project Manager

Enclosure
KFY/hsf

STL Burlington Data Qualifier Definitions

Organic

U: Compound analyzed but not detected at a concentration above the reporting limit.

J: Estimated value.

N: Indicates presumptive evidence of a compound. This flag is used only for tentatively identified compounds (TICs) where the identification of a compound is based on a mass spectral library search.

P: SW-846: Greater than 40% difference for detected concentrations between two GC columns. Unless otherwise specified the higher of the two values is reported on the Form I.

CLP SOW: Greater than 25% difference for detected concentrations between two GC columns. Unless otherwise specified the lower of the two values is reported on the Form I.

C: Pesticide result whose identification has been confirmed by GC/MS.

B: Analyte is found in the sample and the associated method blank. The flag is used for tentatively identified compounds as well as positively identified compounds.

E: Compounds whose concentrations exceed the upper limit of the calibration range of the instrument for that specific analysis.

D: Concentrations identified from analysis of the sample at a secondary dilution.

A: Tentatively identified compound is a suspected aldol condensation product.

X,Y,Z: Laboratory defined flags that may be used alone or combined, as needed. If used, the description of the flag is defined in the project narrative.

Inorganic/Metals

E: Reported value is estimated due to the presence of interference.

N: Matrix spike sample recovery is not within control limits.

* Duplicate sample analysis is not within control limits.

B: The result reported is less than the reporting limit but greater than the instrument detection limit.

U: Analyte was analyzed for but not detected above the reporting limit.

Method Codes:

P	ICP-AES
MS	ICP-MS
CV	Cold Vapor AA
AS	Semi-Automated Spectrophotometric

3437

| | | |

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-23772 10A

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716822

Sample wt/vol: 11.2 (g/mL) G Lab File ID: 716822E

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	8.9	U
74-87-3	Chloromethane	4.8	JB
75-01-4	Vinyl Chloride	8.9	U
74-83-9	Bromomethane	10	B
75-00-3	Chloroethane	8.9	U
75-69-4	Trichlorofluoromethane	8.9	U
107-02-8	Acrolein	45	U
75-35-4	1,1-Dichloroethene	8.9	U
76-13-1	Freon TF	8.9	U
67-64-1	Acetone	45	U
74-88-4	Methyl Iodide	20	B
75-15-0	Carbon Disulfide	8.9	U
107-05-1	Allyl Chloride	8.9	U
75-09-2	Methylene Chloride	8.9	U
107-13-1	Acrylonitrile	8.9	U
156-60-5	trans-1,2-Dichloroethene	8.9	U
1634-04-4	Methyl-t-Butyl Ether	8.9	U
540-59-0	1,2-Dichloroethene (total)	8.9	U
75-34-3	1,1-Dichloroethane	8.9	U
108-05-4	Vinyl Acetate	8.9	U
126-99-8	Chloroprene	8.9	U
594-20-7	2,2-Dichloropropane	8.9	U
156-59-2	cis-1,2-Dichloroethene	8.9	U
78-93-3	2-Butanone	50	B
107-12-0	Propionitrile	36	U
74-97-5	Bromochloromethane	8.9	U
126-98-7	Methacrylonitrile	8.9	U
109-99-9	Tetrahydrofuran	130	U
67-66-3	Chloroform	24	B
71-55-6	1,1,1-Trichloroethane	240	B
56-23-5	Carbon Tetrachloride	8.9	U
563-58-6	1,1-Dichloropropene	8.9	U
71-43-2	Benzene	8.9	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-23772 10A

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716822

Sample wt/vol: 11.2 (g/mL) G Lab File ID: 716822E

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
78-83-1	Isobutyl Alcohol	450	U
107-06-2	1,2-Dichloroethane	8.9	U
79-01-6	Trichloroethene	8.9	U
78-87-5	1,2-Dichloropropane	8.9	U
74-95-3	Dibromomethane	8.9	U
80-62-6	Methyl Methacrylate	8.9	U
123-91-1	1,4-Dioxane	450	U
75-27-4	Bromodichloromethane	8.9	U
110-75-8	2-Chloroethyl Vinyl Ether	8.9	U
10061-01-5	cis-1,3-Dichloropropene	8.9	U
108-10-1	4-Methyl-2-pentanone	45	U
108-88-3	Toluene	8.9	U
10061-02-6	trans-1,3-Dichloropropene	8.9	U
97-63-2	Ethyl Methacrylate	8.9	U
79-00-5	1,1,2-Trichloroethane	8.9	U
127-18-4	Tetrachloroethene	2.1	J
142-28-9	1,3-Dichloropropane	8.9	U
591-78-6	2-Hexanone	45	U
124-48-1	Dibromochloromethane	8.9	U
106-93-4	1,2-Dibromoethane	8.9	U
108-90-7	Chlorobenzene	8.9	U
630-20-6	1,1,1,2-Tetrachloroethane	8.9	U
100-41-4	Ethylbenzene	8.9	U
1330-20-7	Xylene (m,p)	3.2	J
95-47-6	Xylene (o)	8.9	U
1330-20-7	Xylene (total)	3.4	J
100-42-5	Styrene	2.1	J
75-25-2	Bromoform	8.9	U
98-82-8	Isopropylbenzene	8.9	U
1476-11-5	cis-1,4-Dichloro-2-butene	8.9	U
108-86-1	Bromobenzene	2.0	J
79-34-5	1,1,2,2-Tetrachloroethane	2.0	J
96-18-4	1,2,3-Trichloropropane	2.3	J

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-23772 10A

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716822

Sample wt/vol: 11.2 (g/mL) G Lab File ID: 716822E

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
110-57-6	trans-1,4-Dichloro-2-butene	3.3	J
103-65-1	n-Propylbenzene	8.9	U
95-49-8	2-Chlorotoluene	8.9	U
106-43-4	4-Chlorotoluene	2.2	J
108-67-8	1,3,5-Trimethylbenzene	8.9	U
98-06-6	tert-Butylbenzene	8.9	U
95-63-6	1,2,4-Trimethylbenzene	2.2	J
135-98-8	sec-Butylbenzene	8.9	U
541-73-1	1,3-Dichlorobenzene	3.6	J
99-87-6	4-Isopropyltoluene	8.9	U
106-46-7	1,4-Dichlorobenzene	3.9	J
95-50-1	1,2-Dichlorobenzene	3.5	J
104-51-8	n-Butylbenzene	2.3	J
96-12-8	1,2-Dibromo-3-Chloropropane	5.3	J
120-82-1	1,2,4-Trichlorobenzene	8.5	JB
87-68-3	Hexachlorobutadiene	8.9	U
91-20-3	Naphthalene	13	B
87-61-6	1,2,3-Trichlorobenzene	8.4	JB

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-23782 30A

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716823

Sample wt/vol: 9.6 (g/mL) G Lab File ID: 716823E

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	10	U
74-87-3	Chloromethane	4.9	JB
75-01-4	Vinyl Chloride	10	U
74-83-9	Bromomethane	8.1	JB
75-00-3	Chloroethane	10	U
75-69-4	Trichlorofluoromethane	10	U
107-02-8	Acrolein	52	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	Freon TF	10	U
67-64-1	Acetone	52	U
74-88-4	Methyl Iodide	15	B
75-15-0	Carbon Disulfide	10	U
107-05-1	Allyl Chloride	10	U
75-09-2	Methylene Chloride	10	U
107-13-1	Acrylonitrile	10	U
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl-t-Butyl Ether	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
75-34-3	1,1-Dichloroethane	10	U
108-05-4	Vinyl Acetate	10	U
126-99-8	Chloroprene	10	U
594-20-7	2,2-Dichloropropane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	25	JB
107-12-0	Propionitrile	42	U
74-97-5	Bromochloromethane	10	U
126-98-7	Methacrylonitrile	10	U
109-99-9	Tetrahydrofuran	150	U
67-66-3	Chloroform	23	B
71-55-6	1,1,1-Trichloroethane	230	B
56-23-5	Carbon Tetrachloride	10	U
563-58-6	1,1-Dichloropropene	10	U
71-43-2	Benzene	10	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-23782 30A

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716823

Sample wt/vol: 9.6 (g/mL) G Lab File ID: 716823E

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
78-83-1	Isobutyl Alcohol	520	U
107-06-2	1,2-Dichloroethane	10	U
79-01-6	Trichloroethene	10	U
78-87-5	1,2-Dichloropropane	10	U
74-95-3	Dibromomethane	10	U
80-62-6	Methyl Methacrylate	10	U
123-91-1	1,4-Dioxane	520	U
75-27-4	Bromodichloromethane	10	U
110-75-8	2-Chloroethyl Vinyl Ether	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-pentanone	52	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
97-63-2	Ethyl Methacrylate	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	2.4	J
142-28-9	1,3-Dichloropropane	10	U
591-78-6	2-Hexanone	52	U
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	10	U
630-20-6	1,1,1,2-Tetrachloroethane	10	U
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (m,p)	2.7	J
95-47-6	Xylene (o)	10	U
1330-20-7	Xylene (total)	2.9	J
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
1476-11-5	cis-1,4-Dichloro-2-butene	10	U
108-86-1	Bromobenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
96-18-4	1,2,3-Trichloropropane	10	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-23782 30A

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716823

Sample wt/vol: 9.6 (g/mL) G Lab File ID: 716823E

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
110-57-6	trans-1,4-Dichloro-2-butene	2.8	J
103-65-1	n-Propylbenzene	10	U
95-49-8	2-Chlorotoluene	10	U
106-43-4	4-Chlorotoluene	10	U
108-67-8	1,3,5-Trimethylbenzene	10	U
98-06-6	tert-Butylbenzene	10	U
95-63-6	1,2,4-Trimethylbenzene	10	U
135-98-8	sec-Butylbenzene	10	U
541-73-1	1,3-Dichlorobenzene	3.0	J
99-87-6	4-Isopropyltoluene	10	U
106-46-7	1,4-Dichlorobenzene	3.5	J
95-50-1	1,2-Dichlorobenzene	2.8	J
104-51-8	n-Butylbenzene	10	U
96-12-8	1,2-Dibromo-3-Chloropropane	3.1	J
120-82-1	1,2,4-Trichlorobenzene	6.2	JB
87-68-3	Hexachlorobutadiene	10	U
91-20-3	Naphthalene	10	JB
87-61-6	1,2,3-Trichlorobenzene	6.6	JB

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-23785 20A

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716821

Sample wt/vol: 12.5 (g/mL) G Lab File ID: 716821E

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	8.0	U
74-87-3	Chloromethane	5.4	JB
75-01-4	Vinyl Chloride	8.0	U
74-83-9	Bromomethane	10	B
75-00-3	Chloroethane	8.0	U
75-69-4	Trichlorofluoromethane	8.0	U
107-02-8	Acrolein	40	U
75-35-4	1,1-Dichloroethene	8.0	U
76-13-1	Freon TF	8.0	U
67-64-1	Acetone	40	U
74-88-4	Methyl Iodide	17	B
75-15-0	Carbon Disulfide	8.0	U
107-05-1	Allyl Chloride	8.0	U
75-09-2	Methylene Chloride	8.0	U
107-13-1	Acrylonitrile	8.0	U
156-60-5	trans-1,2-Dichloroethene	8.0	U
1634-04-4	Methyl-t-Butyl Ether	8.0	U
540-59-0	1,2-Dichloroethene (total)	8.0	U
75-34-3	1,1-Dichloroethane	8.0	U
108-05-4	Vinyl Acetate	8.0	U
126-99-8	Chloroprene	8.0	U
594-20-7	2,2-Dichloropropane	8.0	U
156-59-2	cis-1,2-Dichloroethene	8.0	U
78-93-3	2-Butanone	58	B
107-12-0	Propionitrile	32	U
74-97-5	Bromochloromethane	8.0	U
126-98-7	Methacrylonitrile	8.0	U
109-99-9	Tetrahydrofuran	110	U
67-66-3	Chloroform	20	B
71-55-6	1,1,1-Trichloroethane	190	B
56-23-5	Carbon Tetrachloride	8.0	U
563-58-6	1,1-Dichloropropene	8.0	U
71-43-2	Benzene	8.0	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-23785 20A

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716821

Sample wt/vol: 12.5 (g/mL) G Lab File ID: 716821E

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
78-83-1	Isobutyl Alcohol	400	U
107-06-2	1,2-Dichloroethane	8.0	U
79-01-6	Trichloroethene	8.0	U
78-87-5	1,2-Dichloropropane	8.0	U
74-95-3	Dibromomethane	8.0	U
80-62-6	Methyl Methacrylate	8.0	U
123-91-1	1,4-Dioxane	400	U
75-27-4	Bromodichloromethane	8.0	U
110-75-8	2-Chloroethyl Vinyl Ether	8.0	U
10061-01-5	cis-1,3-Dichloropropene	8.0	U
108-10-1	4-Methyl-2-pentanone	40	U
108-88-3	Toluene	8.0	U
10061-02-6	trans-1,3-Dichloropropene	8.0	U
97-63-2	Ethyl Methacrylate	8.0	U
79-00-5	1,1,2-Trichloroethane	8.0	U
127-18-4	Tetrachloroethene	8.0	U
142-28-9	1,3-Dichloropropane	8.0	U
591-78-6	2-Hexanone	40	U
124-48-1	Dibromochloromethane	8.0	U
106-93-4	1,2-Dibromoethane	8.0	U
108-90-7	Chlorobenzene	8.0	U
630-20-6	1,1,1,2-Tetrachloroethane	8.0	U
100-41-4	Ethylbenzene	8.0	U
1330-20-7	Xylene (m,p)	2.6	J
95-47-6	Xylene (o)	8.0	U
1330-20-7	Xylene (total)	2.8	J
100-42-5	Styrene	8.0	U
75-25-2	Bromoform	8.0	U
98-82-8	Isopropylbenzene	8.0	U
1476-11-5	cis-1,4-Dichloro-2-butene	8.0	U
108-86-1	Bromobenzene	1.7	J
79-34-5	1,1,2,2-Tetrachloroethane	2.1	J
96-18-4	1,2,3-Trichloropropane	2.5	J

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-23785 20A

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716821

Sample wt/vol: 12.5 (g/mL) G Lab File ID: 716821E

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
110-57-6	trans-1,4-Dichloro-2-butene	3.5	J
103-65-1	n-Propylbenzene	8.0	U
95-49-8	2-Chlorotoluene	8.0	U
106-43-4	4-Chlorotoluene	2.2	J
108-67-8	1,3,5-Trimethylbenzene	2.0	J
98-06-6	tert-Butylbenzene	8.0	U
95-63-6	1,2,4-Trimethylbenzene	2.6	J
135-98-8	sec-Butylbenzene	8.0	U
541-73-1	1,3-Dichlorobenzene	3.1	J
99-87-6	4-Isopropyltoluene	8.0	U
106-46-7	1,4-Dichlorobenzene	3.5	J
95-50-1	1,2-Dichlorobenzene	3.2	J
104-51-8	n-Butylbenzene	2.2	J
96-12-8	1,2-Dibromo-3-Chloropropane	6.7	J
120-82-1	1,2,4-Trichlorobenzene	8.1	B
87-68-3	Hexachlorobutadiene	2.3	J
91-20-3	Naphthalene	11	B
87-61-6	1,2,3-Trichlorobenzene	9.0	B

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-23810 10A

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716824

Sample wt/vol: 13.1 (g/mL) G Lab File ID: 716824E

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	7.7	U
74-87-3	Chloromethane	2.2	JB
75-01-4	Vinyl Chloride	7.7	U
74-83-9	Bromomethane	4.5	JB
75-00-3	Chloroethane	7.7	U
75-69-4	Trichlorofluoromethane	7.7	U
107-02-8	Acrolein	38	U
75-35-4	1,1-Dichloroethene	7.7	U
76-13-1	Freon TF	7.7	U
67-64-1	Acetone	38	U
74-88-4	Methyl Iodide	5.4	JB
75-15-0	Carbon Disulfide	7.7	U
107-05-1	Allyl Chloride	7.7	U
75-09-2	Methylene Chloride	7.7	U
107-13-1	Acrylonitrile	7.7	U
156-60-5	trans-1,2-Dichloroethene	7.7	U
1634-04-4	Methyl-t-Butyl Ether	7.7	U
540-59-0	1,2-Dichloroethene (total)	7.7	U
75-34-3	1,1-Dichloroethane	7.7	U
108-05-4	Vinyl Acetate	7.7	U
126-99-8	Chloroprene	7.7	U
594-20-7	2,2-Dichloropropane	7.7	U
156-59-2	cis-1,2-Dichloroethene	7.7	U
78-93-3	2-Butanone	80	B
107-12-0	Propionitrile	31	U
74-97-5	Bromochloromethane	7.7	U
126-98-7	Methacrylonitrile	7.7	U
109-99-9	Tetrahydrofuran	110	U
67-66-3	Chloroform	7.7	U
71-55-6	1,1,1-Trichloroethane	7.7	U
56-23-5	Carbon Tetrachloride	7.7	U
563-58-6	1,1-Dichloropropene	7.7	U
71-43-2	Benzene	7.7	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-23810 10A

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716824

Sample wt/vol: 13.1 (g/mL) G Lab File ID: 716824E

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
78-83-1	Isobutyl Alcohol	380	U
107-06-2	1,2-Dichloroethane	7.7	U
79-01-6	Trichloroethene	7.7	U
78-87-5	1,2-Dichloropropane	7.7	U
74-95-3	Dibromomethane	7.7	U
80-62-6	Methyl Methacrylate	7.7	U
123-91-1	1,4-Dioxane	380	U
75-27-4	Bromodichloromethane	7.7	U
110-75-8	2-Chloroethyl Vinyl Ether	7.7	U
10061-01-5	cis-1,3-Dichloropropene	7.7	U
108-10-1	4-Methyl-2-pentanone	38	U
108-88-3	Toluene	1.8	J
10061-02-6	trans-1,3-Dichloropropene	7.7	U
97-63-2	Ethyl Methacrylate	7.7	U
79-00-5	1,1,2-Trichloroethane	7.7	U
127-18-4	Tetrachloroethene	7.7	U
142-28-9	1,3-Dichloropropane	7.7	U
591-78-6	2-Hexanone	38	U
124-48-1	Dibromochloromethane	7.7	U
106-93-4	1,2-Dibromoethane	7.7	U
108-90-7	Chlorobenzene	7.7	U
630-20-6	1,1,1,2-Tetrachloroethane	7.7	U
100-41-4	Ethylbenzene	7.7	U
1330-20-7	Xylene (m,p)	3.0	J
95-47-6	Xylene (o)	7.7	U
1330-20-7	Xylene (total)	3.2	J
100-42-5	Styrene	7.7	U
75-25-2	Bromoform	7.7	U
98-82-8	Isopropylbenzene	7.7	U
1476-11-5	cis-1,4-Dichloro-2-butene	7.7	U
108-86-1	Bromobenzene	7.7	U
79-34-5	1,1,2,2-Tetrachloroethane	7.7	U
96-18-4	1,2,3-Trichloropropane	7.7	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-23810 10A

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716824

Sample wt/vol: 13.1 (g/mL) G Lab File ID: 716824E

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
110-57-6	trans-1,4-Dichloro-2-butene	7.7	U
103-65-1	n-Propylbenzene	7.7	U
95-49-8	2-Chlorotoluene	7.7	U
106-43-4	4-Chlorotoluene	7.7	U
108-67-8	1,3,5-Trimethylbenzene	7.7	U
98-06-6	tert-Butylbenzene	7.7	U
95-63-6	1,2,4-Trimethylbenzene	7.7	U
135-98-8	sec-Butylbenzene	7.7	U
541-73-1	1,3-Dichlorobenzene	7.7	U
99-87-6	4-Isopropyltoluene	7.7	U
106-46-7	1,4-Dichlorobenzene	1.7	J
95-50-1	1,2-Dichlorobenzene	7.7	U
104-51-8	n-Butylbenzene	7.7	U
96-12-8	1,2-Dibromo-3-Chloropropane	7.7	U
120-82-1	1,2,4-Trichlorobenzene	3.1	JB
87-68-3	Hexachlorobutadiene	7.7	U
91-20-3	Naphthalene	5.3	JB
87-61-6	1,2,3-Trichlorobenzene	3.3	JB

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-23814 16A

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716825

Sample wt/vol: 11.0 (g/mL) G Lab File ID: 716825E

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	9.1	U
74-87-3	Chloromethane	3.1	JB
75-01-4	Vinyl Chloride	9.1	U
74-83-9	Bromomethane	6.2	JB
75-00-3	Chloroethane	9.1	U
75-69-4	Trichlorofluoromethane	9.1	U
107-02-8	Acrolein	46	U
75-35-4	1,1-Dichloroethene	9.1	U
76-13-1	Freon TF	9.1	U
67-64-1	Acetone	46	U
74-88-4	Methyl Iodide	6.1	JB
75-15-0	Carbon Disulfide	9.1	U
107-05-1	Allyl Chloride	9.1	U
75-09-2	Methylene Chloride	9.1	U
107-13-1	Acrylonitrile	9.1	U
156-60-5	trans-1,2-Dichloroethene	9.1	U
1634-04-4	Methyl-t-Butyl Ether	9.1	U
540-59-0	1,2-Dichloroethene (total)	9.1	U
75-34-3	1,1-Dichloroethane	9.1	U
108-05-4	Vinyl Acetate	9.1	U
126-99-8	Chloroprene	9.1	U
594-20-7	2,2-Dichloropropane	9.1	U
156-59-2	cis-1,2-Dichloroethene	9.1	U
78-93-3	2-Butanone	93	B
107-12-0	Propionitrile	36	U
74-97-5	Bromochloromethane	9.1	U
126-98-7	Methacrylonitrile	9.1	U
109-99-9	Tetrahydrofuran	130	U
67-66-3	Chloroform	9.1	U
71-55-6	1,1,1-Trichloroethane	9.1	U
56-23-5	Carbon Tetrachloride	9.1	U
563-58-6	1,1-Dichloropropene	9.1	U
71-43-2	Benzene	9.1	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-23814 16A

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716825

Sample wt/vol: 11.0 (g/mL) G Lab File ID: 716825E

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
78-83-1	Isobutyl Alcohol	460	U
107-06-2	1,2-Dichloroethane	9.1	U
79-01-6	Trichloroethene	9.1	U
78-87-5	1,2-Dichloropropane	9.1	U
74-95-3	Dibromomethane	9.1	U
80-62-6	Methyl Methacrylate	9.1	U
123-91-1	1,4-Dioxane	460	U
75-27-4	Bromodichloromethane	9.1	U
110-75-8	2-Chloroethyl Vinyl Ether	9.1	U
10061-01-5	cis-1,3-Dichloropropene	9.1	U
108-10-1	4-Methyl-2-pentanone	46	U
108-88-3	Toluene	3.1	J
10061-02-6	trans-1,3-Dichloropropene	9.1	U
97-63-2	Ethyl Methacrylate	9.1	U
79-00-5	1,1,2-Trichloroethane	9.1	U
127-18-4	Tetrachloroethene	2.2	J
142-28-9	1,3-Dichloropropane	9.1	U
591-78-6	2-Hexanone	46	U
124-48-1	Dibromochloromethane	9.1	U
106-93-4	1,2-Dibromoethane	9.1	U
108-90-7	Chlorobenzene	9.1	U
630-20-6	1,1,1,2-Tetrachloroethane	9.1	U
100-41-4	Ethylbenzene	9.1	U
1330-20-7	Xylene (m,p)	4.7	J
95-47-6	Xylene (o)	2.1	J
1330-20-7	Xylene (total)	7.1	J
100-42-5	Styrene	9.1	U
75-25-2	Bromoform	9.1	U
98-82-8	Isopropylbenzene	9.1	U
1476-11-5	cis-1,4-Dichloro-2-butene	9.1	U
108-86-1	Bromobenzene	9.1	U
79-34-5	1,1,2,2-Tetrachloroethane	9.1	U
96-18-4	1,2,3-Trichloropropane	9.1	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-23814 16A

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716825

Sample wt/vol: 11.0 (g/mL) G Lab File ID: 716825E

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
110-57-6	trans-1,4-Dichloro-2-butene	9.1	U
103-65-1	n-Propylbenzene	9.1	U
95-49-8	2-Chlorotoluene	9.1	U
106-43-4	4-Chlorotoluene	9.1	U
108-67-8	1,3,5-Trimethylbenzene	9.1	U
98-06-6	tert-Butylbenzene	9.1	U
95-63-6	1,2,4-Trimethylbenzene	9.1	U
135-98-8	sec-Butylbenzene	9.1	U
541-73-1	1,3-Dichlorobenzene	1.9	J
99-87-6	4-Isopropyltoluene	9.1	U
106-46-7	1,4-Dichlorobenzene	2.3	J
95-50-1	1,2-Dichlorobenzene	9.1	U
104-51-8	n-Butylbenzene	9.1	U
96-12-8	1,2-Dibromo-3-Chloropropane	9.1	U
120-82-1	1,2,4-Trichlorobenzene	4.0	JB
87-68-3	Hexachlorobutadiene	9.1	U
91-20-3	Naphthalene	6.8	JB
87-61-6	1,2,3-Trichlorobenzene	3.5	JB

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-MEOHBLK1

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716826

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 716826E2

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	10	U
74-87-3	Chloromethane	4.0	J
75-01-4	Vinyl Chloride	10	U
74-83-9	Bromomethane	5.9	J
75-00-3	Chloroethane	10	U
75-69-4	Trichlorofluoromethane	10	U
107-02-8	Acrolein	50	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	Freon TF	10	U
67-64-1	Acetone	50	U
74-88-4	Methyl Iodide	5.2	J
75-15-0	Carbon Disulfide	10	U
107-05-1	Allyl Chloride	10	U
75-09-2	Methylene Chloride	10	U
107-13-1	Acrylonitrile	10	U
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl-t-Butyl Ether	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
75-34-3	1,1-Dichloroethane	10	U
108-05-4	Vinyl Acetate	10	U
126-99-8	Chloroprene	10	U
594-20-7	2,2-Dichloropropane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	60	
107-12-0	Propionitrile	40	U
74-97-5	Bromochloromethane	10	U
126-98-7	Methacrylonitrile	10	U
109-99-9	Tetrahydrofuran	140	U
67-66-3	Chloroform	8.1	J
71-55-6	1,1,1-Trichloroethane	140	
56-23-5	Carbon Tetrachloride	10	U
563-58-6	1,1-Dichloropropene	10	U
71-43-2	Benzene	10	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-MEOHBLK1

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716826

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 716826E2

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
78-83-1	Isobutyl Alcohol	500	U
107-06-2	1,2-Dichloroethane	10	U
79-01-6	Trichloroethene	10	U
78-87-5	1,2-Dichloropropane	10	U
74-95-3	Dibromomethane	10	U
80-62-6	Methyl Methacrylate	10	U
123-91-1	1,4-Dioxane	500	U
75-27-4	Bromodichloromethane	10	U
110-75-8	2-Chloroethyl Vinyl Ether	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-pentanone	50	U
108-88-3	Toluene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
97-63-2	Ethyl Methacrylate	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	10	U
142-28-9	1,3-Dichloropropane	10	U
591-78-6	2-Hexanone	50	U
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	10	U
630-20-6	1,1,1,2-Tetrachloroethane	10	U
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (m,p)	10	U
95-47-6	Xylene (o)	10	U
1330-20-7	Xylene (total)	10	U
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
1476-11-5	cis-1,4-Dichloro-2-butene	10	U
108-86-1	Bromobenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
96-18-4	1,2,3-Trichloropropane	10	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-MEOHBLK1

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716826

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 716826E2

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
110-57-6	trans-1,4-Dichloro-2-butene	10	U
103-65-1	n-Propylbenzene	10	U
95-49-8	2-Chlorotoluene	10	U
106-43-4	4-Chlorotoluene	10	U
108-67-8	1,3,5-Trimethylbenzene	10	U
98-06-6	tert-Butylbenzene	10	U
95-63-6	1,2,4-Trimethylbenzene	10	U
135-98-8	sec-Butylbenzene	10	U
541-73-1	1,3-Dichlorobenzene	10	U
99-87-6	4-Isopropyltoluene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
104-51-8	n-Butylbenzene	10	U
96-12-8	1,2-Dibromo-3-Chloropropane	10	U
120-82-1	1,2,4-Trichlorobenzene	3.5	J
87-68-3	Hexachlorobutadiene	10	U
91-20-3	Naphthalene	6.3	J
87-61-6	1,2,3-Trichlorobenzene	2.8	J

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-MEOH BLK 2

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716827

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 716827E

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
75-71-8	Dichlorodifluoromethane	10	U
74-87-3	Chloromethane	3.7	JB
75-01-4	Vinyl Chloride	10	U
74-83-9	Bromomethane	5.9	JB
75-00-3	Chloroethane	10	U
75-69-4	Trichlorofluoromethane	10	U
107-02-8	Acrolein	50	U
75-35-4	1,1-Dichloroethene	10	U
76-13-1	Freon TF	10	U
67-64-1	Acetone	50	U
74-88-4	Methyl Iodide	6.0	JB
75-15-0	Carbon Disulfide	10	U
107-05-1	Allyl Chloride	10	U
75-09-2	Methylene Chloride	10	U
107-13-1	Acrylonitrile	10	U
156-60-5	trans-1,2-Dichloroethene	10	U
1634-04-4	Methyl-t-Butyl Ether	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
75-34-3	1,1-Dichloroethane	10	U
108-05-4	Vinyl Acetate	10	U
126-99-8	Chloroprene	10	U
594-20-7	2,2-Dichloropropane	10	U
156-59-2	cis-1,2-Dichloroethene	10	U
78-93-3	2-Butanone	75	B
107-12-0	Propionitrile	40	U
74-97-5	Bromochloromethane	10	U
126-98-7	Methacrylonitrile	10	U
109-99-9	Tetrahydrofuran	140	U
67-66-3	Chloroform	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
563-58-6	1,1-Dichloropropene	10	U
71-43-2	Benzene	10	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-MEOH BLK 2

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716827

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 716827E

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
78-83-1	Isobutyl Alcohol	500	U
107-06-2	1,2-Dichloroethane	10	U
79-01-6	Trichloroethene	10	U
78-87-5	1,2-Dichloropropane	10	U
74-95-3	Dibromomethane	10	U
80-62-6	Methyl Methacrylate	10	U
123-91-1	1,4-Dioxane	500	U
75-27-4	Bromodichloromethane	10	U
110-75-8	2-Chloroethyl Vinyl Ether	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
108-10-1	4-Methyl-2-pentanone	50	U
108-88-3	Toluene	2.9	J
10061-02-6	trans-1,3-Dichloropropene	10	U
97-63-2	Ethyl Methacrylate	10	U
79-00-5	1,1,2-Trichloroethane	10	U
127-18-4	Tetrachloroethene	10	U
142-28-9	1,3-Dichloropropane	10	U
591-78-6	2-Hexanone	50	U
124-48-1	Dibromochloromethane	10	U
106-93-4	1,2-Dibromoethane	10	U
108-90-7	Chlorobenzene	10	U
630-20-6	1,1,1,2-Tetrachloroethane	10	U
100-41-4	Ethylbenzene	10	U
1330-20-7	Xylene (m,p)	4.5	J
95-47-6	Xylene (o)	2.1	J
1330-20-7	Xylene (total)	6.9	J
100-42-5	Styrene	10	U
75-25-2	Bromoform	10	U
98-82-8	Isopropylbenzene	10	U
1476-11-5	cis-1,4-Dichloro-2-butene	10	U
108-86-1	Bromobenzene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
96-18-4	1,2,3-Trichloropropane	10	U

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

ARGLAB SAMPLE NO.

HL-S-MEOH BLK 2

Lab Name: STL BURLINGTON Contract: 21005

Lab Code: STLVT Case No.: HUTTON SAS No.: SDG No.: 120797

Matrix: (soil/water) SOIL Lab Sample ID: 716827

Sample wt/vol: 10.0 (g/mL) G Lab File ID: 716827E

Level: (low/med) MED Date Received: 07/07/07

% Moisture: not dec. _____ Date Analyzed: 07/16/07

GC Column: CAP ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000(uL) Soil Aliquot Volume: 500(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
110-57-6	trans-1,4-Dichloro-2-butene	10	U
103-65-1	n-Propylbenzene	10	U
95-49-8	2-Chlorotoluene	10	U
106-43-4	4-Chlorotoluene	10	U
108-67-8	1,3,5-Trimethylbenzene	10	U
98-06-6	tert-Butylbenzene	10	U
95-63-6	1,2,4-Trimethylbenzene	10	U
135-98-8	sec-Butylbenzene	10	U
541-73-1	1,3-Dichlorobenzene	10	U
99-87-6	4-Isopropyltoluene	10	U
106-46-7	1,4-Dichlorobenzene	2.1	J
95-50-1	1,2-Dichlorobenzene	10	U
104-51-8	n-Butylbenzene	10	U
96-12-8	1,2-Dibromo-3-Chloropropane	3.0	J
120-82-1	1,2,4-Trichlorobenzene	3.3	JB
87-68-3	Hexachlorobutadiene	10	U
91-20-3	Naphthalene	6.4	JB
87-61-6	1,2,3-Trichlorobenzene	2.9	JB

Water Verification Analyses
by Envirosystems, Inc.

ENVIROSYSTEMS, INC.

9200 Rumsey Road • Suite B102 • Columbia, Maryland 21045-1934
Phone (410) 964-0330 • Fax (410) 740-9306
Email: info@envsystems.com • Webpage: www.envsystems.com/envsys

July 27, 2007

Jorge S. Alvarado, Ph.D
Argonne National Laboratory
Environmental Research Division
Applied Geoscience and Environmental
Management Section
9700 South Cass Avenue, ER-203
Argonne, Illinois 60439

RE: ENVSY Report 070251

Dear Jorge:

Enclosed are the results of analysis for the samples received on July 03, 2007 for volatile organics analysis by US EPA CLP 8260B with a lower reporting limit of 5ug/L.

Please do not hesitate to call me if you have any questions, comments, or require additional information.

Sincerely,

Thomas Scott

FOR → Mohan Khare, Ph.D
President/CEO

MK/ncc

SDG NARRATIVE

Envirosystems, Inc.

Contract: N/A
Client: Argonne National Laboratory
Work Order: 0070701
SDG: Arg70701

SAMPLE RECIEPT

Date received: July 3, 2007
Cooler Temperature: 3-deg C

Sample Summary

Client ID	Laboratory ID	Matrix	Fraction	pH
HL-TIO2-W-2391-A	0070701-01	WATER	VOA	7
HL-TIO3-W-23795-A	0070701-02	WATER	VOA	7
HL-6W01-W23829-A	0070701-03	WATER	VOA	7
HL-TB-020707-A	0070701-04	WATER	VOA	5

VOLATILES SECTION

1. HOLDING TIMES

All holding times were met.

2. METHODS

8260B/CLPLIKE

3. INSTRUMENT AND CHROMATOGRAPHIC CONDITIONS

A Hewlett Packard 6890 gas chromatograph equipped with a Hewlett Packard 5975 MSD was used for sample analysis. The capillary column used was a Restek 20m by 0.18 mm ID by 1.0 µm film thickness (Restek Cat. # RTX-624). The trap used with the sample concentrator is an EST K Trap, 30cm packed with Carbopack B / Carboxen 1000 & 1001 (VOCARB 3000)

4. PREPARATION

Water samples were prepared by 8260B

5. ANALYSIS

A. Calibration:

Initial calibration met all acceptance criteria.

B. Blanks:

All acceptance criteria were met.

SDG NARRATIVE

C. Surrogates/Deuterated Monitoring Compounds (DMCs):

All acceptance criteria were met with the exception of sample HL-TIO2-W-23791-A which had 2 out of 3 surrogates outside QC limits. The most probable cause for the variances is matrix effect. No further action was taken.

D. Spikes:

I. Laboratory Control Spikes (LCS)

Laboratory Control Spikes were not used for this method.

II. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD were not used for this method.

III. Internal Standards

All acceptance criteria were met.

E. Samples

Sample analysis proceeded normally. Note that sample HL-6W01-W-23829-ADL required a 1:50 dilution. Both the full and diluted runs are reported.

Manual Integration Summary

The chemist manually integrated the following standards and samples: None.

Reason Codes:

A. Baseline integration, re-inforced due to interference on target peak.
B. Baseline integration, peak not properly integrated by software integrator.
C. Target peak was not properly identified, more than one peak in retention time window.
D. Split peak, more than one peak in retention time window.

I certify that this Sample Data Package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in the hard copy Sample Data Package and in the Electronic Data Deliverables has been authorized by the laboratory manager or the manager's designee, as verified by the following signatures.

Thomas Scott
Laboratory Manager

7/26/07
Date

3028

MATRIX: WATER	**ARGONNE NATIONAL LABORATORY CHAIN OF CUSTODY RECORD***	Shipping Container No.
RECEIVING LAB: ENVIROSYSTEMS		Shipping Info:
PROJECT/SITE: HILTON, KS	ANALYSIS	ANL Field Contact (Name & Temporary Phone):
SAMPLER(S) (Signature) E. Yan / Lawrence		

DATE OF COLLECTION	SAMPLE ID NUMBER(S)	Number of containers	VOCs	REMARKS
6/24/07	HL-TI02-W-23791	2-40mL	✓	
6/25/07	HLTI03-W-23795	2-40mL	✓	
6/28/07	HL-GW01-W-23829	2-20mL	✓	20mL vials (not enough sample)
7/02/07	HL-TB-020707	2-40mL	✓	

Relinquished by (Signature)	Date	Time	Received by (Signature)	Relinquished by (Signature)	Date	Time	Received by (Signature)
[signature]	7/2/07		Barbara Crooke		7/3/07	10 15	

Relinquished by (Signature)	Date	Time	Received for Laboratory by	Date	Time	Remarks
						Temp 3°C

Y	N	FOR LAB USE ONLY
✓		Custody seal was intact when shipment received.
✓		Sample containers were intact when received.
✓		Shipment was at required temperature when received.
✓		Sample labels, Tags and COC agree.

*A sample is under custody if:
1. It is in your possession; or,
2. It is in your view, after having been in your possession; or,
3. It was in your possession and you locked it up; or,
4. It is in a designated secure area.

Argonne National Laboratory, Applied Geosciences & Environmental Mgt. Group, Environmental Research Division, 9700 S. Cass Avenue, Argonne, IL 60439

ER-160 (4-01)

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HL-TIO2-W-23791-A

Lab Name: Envirosystems, Inc. Contract:

Lab Code: ENVSYS Case No.: Mod. Ref No.: SDG No.: ARG70701

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0070701-01

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: AG75HF544.D

Level: (TRACE/LOW/MED) LOW Date Received: 07/03/2007

% Moisture: not dec. Date Analyzed: 07/03/2007

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	U
67-64-1	Acetone	4.5	J
75-15-0	Carbon disulfide	5.0	U
79-20-9	Methyl acetate	5.0	U
75-09-2	Methylene chloride	5.0	U
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-Butanone	5.0	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
110-82-7	Cyclohexane	5.0	U
56-23-5	Carbon Tetrachloride	5.0	U
71-43-2	Benzene	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HL-TIO2-W-23791-A

Lab Name: Envirosystems, Inc. Contract:

Lab Code: ENVSYS Case No.: Mod. Ref No.: SDG No.: ARG70701

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0070701-01

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: AG75HF544.D

Level: (TRACE/LOW/MED) LOW Date Received: 07/03/2007

% Moisture: not dec. Date Analyzed: 07/03/2007

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	5.0	U
108-87-2	Methylcyclohexane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
95-47-6	o-Xylene	5.0	U
179601-23-1	m,p-Xylene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropylbenzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
91-20-3	Naphthalene	5.0	U

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HL-TIO3-W-23795-A

Lab Name: Envirosystems, Inc. Contract:

Lab Code: ENVSYS Case No.: Mod. Ref No.: SDG No.: ARG70701

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0070701-02

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: AG75HF545.D

Level: (TRACE/LOW/MED) LOW Date Received: 07/03/2007

% Moisture: not dec. Date Analyzed: 07/03/2007

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	5.0	U
79-20-9	Methyl acetate	5.0	U
75-09-2	Methylene chloride	5.0	U
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-Butanone	5.0	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
110-82-7	Cyclohexane	5.0	U
56-23-5	Carbon Tetrachloride	5.0	U
71-43-2	Benzene	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HL-TIO3-W-23795-A

Lab Name: Envirosystems, Inc. Contract:

Lab Code: ENVSYS Case No.: Mod. Ref No.: SDG No.: ARG70701

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0070701-02

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: AG75HF545.D

Level: (TRACE/LOW/MED) LOW Date Received: 07/03/2007

% Moisture: not dec. Date Analyzed: 07/03/2007

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	5.0	U
108-87-2	Methylcyclohexane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
95-47-6	o-Xylene	5.0	U
179601-23-1	m,p-Xylene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropylbenzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
91-20-3	Naphthalene	5.0	U

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HL-6W01-W-23829-A

Lab Name: Envirosystems, Inc. Contract:

Lab Code: ENVSYS Case No.: Mod. Ref No.: SDG No.: ARG70701

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0070701-03

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: AG75HF546.D

Level: (TRACE/LOW/MED) LOW Date Received: 07/03/2007

% Moisture: not dec. Date Analyzed: 07/03/2007

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	5.0	U
79-20-9	Methyl acetate	5.0	U
75-09-2	Methylene chloride	1.0	J
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-Butanone	5.0	U
67-66-3	Chloroform	45	
71-55-6	1,1,1-Trichloroethane	5.0	U
110-82-7	Cyclohexane	5.0	U
56-23-5	Carbon Tetrachloride	940	E
71-43-2	Benzene	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HL-6W01-W-23829-A

Lab Name: Envirosystems, Inc. Contract:

Lab Code: ENVSYS Case No.: Mod. Ref No.: SDG No.: ARG70701

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0070701-03

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: AG75HF546.D

Level: (TRACE/LOW/MED) LOW Date Received: 07/03/2007

% Moisture: not dec. Date Analyzed: 07/03/2007

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	5.0	U
108-87-2	Methylcyclohexane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	7.5	
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
95-47-6	o-Xylene	5.0	U
179601-23-1	m,p-Xylene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropylbenzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
91-20-3	Naphthalene	5.0	U

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
EL-6W01-W-23829-ADL

Lab Name: Envirosystems, Inc. Contract:

Lab Code: ENVSYS Case No.: Mod. Ref No.: SDG No.: ARG70701

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0070701-03RE1

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: AG75HF547.D

Level: (TRACE/LOW/MED) LOW Date Received: 07/03/2007

% Moisture: not dec. Date Analyzed: 07/03/2007

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 50.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	250	U
74-87-3	Chloromethane	250	U
75-01-4	Vinyl chloride	250	U
74-83-9	Bromomethane	250	U
75-00-3	Chloroethane	250	U
75-69-4	Trichlorofluoromethane	250	U
75-35-4	1,1-Dichloroethene	250	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	250	U
67-64-1	Acetone	250	U
75-15-0	Carbon disulfide	250	U
79-20-9	Methyl acetate	250	U
75-09-2	Methylene chloride	250	U
156-60-5	trans-1,2-Dichloroethene	250	U
1634-04-4	Methyl tert-butyl ether	250	U
75-34-3	1,1-Dichloroethane	250	U
156-59-2	cis-1,2-Dichloroethene	250	U
78-93-3	2-Butanone	250	U
67-66-3	Chloroform	56	JD
71-55-6	1,1,1-Trichloroethane	250	U
110-82-7	Cyclohexane	250	U
56-23-5	Carbon Tetrachloride	1100	D
71-43-2	Benzene	250	U
107-06-2	1,2-Dichloroethane	250	U

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
BL-6W01-W-23829-ADL

Lab Name: Envirosystems, Inc. Contract:

Lab Code: ENVSYS Case No.: Mod. Ref No.: SDG No.: ARG70701

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0070701-03RE1

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: AG75HF547.D

Level: (TRACE/LOW/MED) LOW Date Received: 07/03/2007

% Moisture: not dec. Date Analyzed: 07/03/2007

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 50.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	250	U
108-87-2	Methylcyclohexane	250	U
78-87-5	1,2-Dichloropropane	250	U
75-27-4	Bromodichloromethane	250	U
10061-01-5	cis-1,3-Dichloropropene	250	U
108-10-1	4-Methyl-2-pentanone	250	U
108-88-3	Toluene	250	U
10061-02-6	trans-1,3-Dichloropropene	250	U
79-00-5	1,1,2-Trichloroethane	250	U
127-18-4	Tetrachloroethene	250	U
591-78-6	2-Hexanone	250	U
124-48-1	Dibromochloromethane	250	U
106-93-4	1,2-Dibromoethane	250	U
108-90-7	Chlorobenzene	250	U
100-41-4	Ethylbenzene	250	U
95-47-6	o-Xylene	250	U
179601-23-1	m,p-Xylene	250	U
100-42-5	Styrene	250	U
75-25-2	Bromoform	250	U
98-82-8	Isopropylbenzene	250	U
79-34-5	1,1,2,2-Tetrachloroethane	250	U
541-73-1	1,3-Dichlorobenzene	250	U
106-46-7	1,4-Dichlorobenzene	250	U
95-50-1	1,2-Dichlorobenzene	250	U
96-12-8	1,2-Dibromo-3-chloropropane	250	U
120-82-1	1,2,4-Trichlorobenzene	250	U
91-20-3	Naphthalene	250	U

1A - FORM I VOA-1
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HL-TB-020707-A

Lab Name: Envirosystems, Inc. Contract:

Lab Code: ENVSYS Case No.: Mod. Ref No.: SDG No.: ARG70701

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0070701-04

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: AG75HF543.D

Level: (TRACE/LOW/MED) LOW Date Received: 07/03/2007

% Moisture: not dec. Date Analyzed: 07/03/2007

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
75-71-8	Dichlorodifluoromethane	5.0	U
74-87-3	Chloromethane	5.0	U
75-01-4	Vinyl chloride	5.0	U
74-83-9	Bromomethane	5.0	U
75-00-3	Chloroethane	5.0	U
75-69-4	Trichlorofluoromethane	5.0	U
75-35-4	1,1-Dichloroethene	5.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.0	U
67-64-1	Acetone	5.0	U
75-15-0	Carbon disulfide	5.0	U
79-20-9	Methyl acetate	5.0	U
75-09-2	Methylene chloride	5.0	U
156-60-5	trans-1,2-Dichloroethene	5.0	U
1634-04-4	Methyl tert-butyl ether	5.0	U
75-34-3	1,1-Dichloroethane	5.0	U
156-59-2	cis-1,2-Dichloroethene	5.0	U
78-93-3	2-Butanone	5.0	U
67-66-3	Chloroform	5.0	U
71-55-6	1,1,1-Trichloroethane	5.0	U
110-82-7	Cyclohexane	5.0	U
56-23-5	Carbon Tetrachloride	5.0	U
71-43-2	Benzene	5.0	U
107-06-2	1,2-Dichloroethane	5.0	U

1B - FORM I VOA-2
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
HL-TB-020707-A

Lab Name: Envirosystems, Inc. Contract:

Lab Code: ENVSYS Case No.: Mod. Ref No.: SDG No.: ARG70701

Matrix: (SOIL/SED/WATER) WATER Lab Sample ID: 0070701-04

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: AG75HF543.D

Level: (TRACE/LOW/MED) LOW Date Received: 07/03/2007

% Moisture: not dec. Date Analyzed: 07/03/2007

GC Column: RTX-624 ID: .18 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

Purge Volume: 5.00 (mL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/kg) UG/L	Q
79-01-6	Trichloroethene	5.0	U
108-87-2	Methylcyclohexane	5.0	U
78-87-5	1,2-Dichloropropane	5.0	U
75-27-4	Bromodichloromethane	5.0	U
10061-01-5	cis-1,3-Dichloropropene	5.0	U
108-10-1	4-Methyl-2-pentanone	5.0	U
108-88-3	Toluene	5.0	U
10061-02-6	trans-1,3-Dichloropropene	5.0	U
79-00-5	1,1,2-Trichloroethane	5.0	U
127-18-4	Tetrachloroethene	5.0	U
591-78-6	2-Hexanone	5.0	U
124-48-1	Dibromochloromethane	5.0	U
106-93-4	1,2-Dibromoethane	5.0	U
108-90-7	Chlorobenzene	5.0	U
100-41-4	Ethylbenzene	5.0	U
95-47-6	o-Xylene	5.0	U
179601-23-1	m,p-Xylene	5.0	U
100-42-5	Styrene	5.0	U
75-25-2	Bromoform	5.0	U
98-82-8	Isopropylbenzene	5.0	U
79-34-5	1,1,2,2-Tetrachloroethane	5.0	U
541-73-1	1,3-Dichlorobenzene	5.0	U
106-46-7	1,4-Dichlorobenzene	5.0	U
95-50-1	1,2-Dichlorobenzene	5.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	U
91-20-3	Naphthalene	5.0	U

Waste Characterization Analyses
by Pace Analytical Services, Inc.

Pace Analytical
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: (913)599-5665
Fax: (913)599-1759

July 06, 2007

Lisa Larsen
Larsen & Associates, Inc.
1311 E. 25th St.
Suite B
Lawrence, KS 66046

RE: Project: Hilton
Pace Project No.: 6025131

Dear Lisa Larsen:
Enclosed are the analytical results for sample(s) received by the laboratory on July 02, 2007. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Trudy Gipson

Trudy Gipson

trudy.gipson@pacelabs.com
Project Manager

A2LA Certification Number: 2456.01
Arkansas Certification Number: 05-008-0
Illinois Certification Number: 001191
Iowa Certification Number: 118
Kansas/NELAP Certification Number: E-10116
Louisiana Certification Number: 03055
Oklahoma Certification Number: 9205/9935
Utah Certification Number: 9135995665

Enclosures

cc: Nadine Appenbrink, Larsen & Associates, Inc.

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: (913)599-5665
Fax: (913)599-1759

SAMPLE SUMMARY

Project: Hilton
Pace Project No.: 6025131

Lab ID	Sample ID	Matrix	Date Collected	Date Received
6025131001	HLPW-W-23831	Water	06/29/07 10:45	07/02/07 10:00

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Fax: (913)599-1759

SAMPLE ANALYTE COUNT

Project: Hilton
Pace Project No.: 6025131

Lab ID	Sample ID	Method	Analytes Reported
6025131001	HLPW-W-23831	EPA 5030B/8260	70

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ANALYTICAL RESULTS

Project: Hilton
Pace Project No.: 6025131

Sample: HLPW-W-23831 Lab ID: 6025131001 Collected: 06/29/07 10:45 Received: 07/02/07 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 5030B/8260							
Acetone	ND	ug/L	10.0	1		07/04/07 07:48	67-64-1	
Benzene	ND	ug/L	1.0	1		07/04/07 07:48	71-43-2	
Bromobenzene	ND	ug/L	1.0	1		07/04/07 07:48	108-86-1	
Bromochloromethane	ND	ug/L	1.0	1		07/04/07 07:48	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	1		07/04/07 07:48	75-27-4	
Bromoform	ND	ug/L	1.0	1		07/04/07 07:48	75-25-2	
Bromomethane	ND	ug/L	1.0	1		07/04/07 07:48	74-83-9	
2-Butanone (MEK)	ND	ug/L	10.0	1		07/04/07 07:48	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	1		07/04/07 07:48	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	1		07/04/07 07:48	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	1		07/04/07 07:48	98-06-6	
Carbon disulfide	ND	ug/L	5.0	1		07/04/07 07:48	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	1		07/04/07 07:48	56-23-5	
Chlorobenzene	ND	ug/L	1.0	1		07/04/07 07:48	108-90-7	
Chloroethane	ND	ug/L	1.0	1		07/04/07 07:48	75-00-3	
Chloroform	ND	ug/L	1.0	1		07/04/07 07:48	67-66-3	
Chloromethane	ND	ug/L	1.0	1		07/04/07 07:48	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	1		07/04/07 07:48	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	1		07/04/07 07:48	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	2.5	1		07/04/07 07:48	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	1		07/04/07 07:48	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	1		07/04/07 07:48	106-93-4	
Dibromomethane	ND	ug/L	1.0	1		07/04/07 07:48	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	1		07/04/07 07:48	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	1		07/04/07 07:48	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	1		07/04/07 07:48	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	1		07/04/07 07:48	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	1		07/04/07 07:48	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		07/04/07 07:48	107-06-2	
1,2-Dichloroethene (Total)	ND	ug/L	1.0	1		07/04/07 07:48	540-59-0	
1,1-Dichloroethene	ND	ug/L	1.0	1		07/04/07 07:48	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		07/04/07 07:48	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		07/04/07 07:48	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	1		07/04/07 07:48	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	1		07/04/07 07:48	142-28-9	
2,2-Dichloropropane	ND	ug/L	1.0	1		07/04/07 07:48	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	1		07/04/07 07:48	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	1.0	1		07/04/07 07:48	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	1		07/04/07 07:48	10061-02-6	
Ethylbenzene	ND	ug/L	1.0	1		07/04/07 07:48	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	1		07/04/07 07:48	87-68-3	
2-Hexanone	ND	ug/L	10.0	1		07/04/07 07:48	591-78-6	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	1		07/04/07 07:48	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	1		07/04/07 07:48	99-87-6	
Methylene chloride	ND	ug/L	1.0	1		07/04/07 07:48	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10.0	1		07/04/07 07:48	108-10-1	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		07/04/07 07:48	1634-04-4	

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ANALYTICAL RESULTS

Project: Hilton
Pace Project No.: 6025131

Sample: HLPW-W-23831 Lab ID: 6025131001 Collected: 06/29/07 10:45 Received: 07/02/07 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 5030B/8260							
Naphthalene	ND	ug/L	10.0	1		07/04/07 07:48	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	1		07/04/07 07:48	103-65-1	
Styrene	ND	ug/L	1.0	1		07/04/07 07:48	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	1		07/04/07 07:48	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	1		07/04/07 07:48	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	1		07/04/07 07:48	127-18-4	
Toluene	ND	ug/L	1.0	1		07/04/07 07:48	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	1		07/04/07 07:48	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	1		07/04/07 07:48	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	1		07/04/07 07:48	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	1		07/04/07 07:48	79-00-5	
Trichloroethene	ND	ug/L	1.0	1		07/04/07 07:48	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	1		07/04/07 07:48	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	2.5	1		07/04/07 07:48	96-18-4	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	1		07/04/07 07:48	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	1		07/04/07 07:48	108-67-8	
Vinyl chloride	ND	ug/L	1.0	1		07/04/07 07:48	75-01-4	
Xylene (Total)	ND	ug/L	3.0	1		07/04/07 07:48	1330-20-7	
4-Bromofluorobenzene (S)	100	%	78-122	1		07/04/07 07:48	460-00-4	
Dibromofluoromethane (S)	99	%	76-128	1		07/04/07 07:48	1868-53-7	
1,2-Dichloroethane-d4 (S)	98	%	82-134	1		07/04/07 07:48	17060-07-0	
Toluene-d8 (S)	100	%	83-109	1		07/04/07 07:48	2037-26-5	
Preservation pH	7.0		0.10	1		07/04/07 07:48		

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July 25, 2007

Lisa Larsen
Larsen & Associates, Inc.
1311 E. 25th St.
Suite B
Lawrence, KS 66046

RE: Project: Hilton
Pace Project No.: 6025617

Dear Lisa Larsen:
Enclosed are the analytical results for sample(s) received by the laboratory on July 12, 2007. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Trudy Gipson

Trudy Gipson

trudy.gipson@pacelabs.com
Project Manager

A2LA Certification Number: 2456.01
Arkansas Certification Number: 05-008-0
Illinois Certification Number: 001191
Iowa Certification Number: 118
Kansas/NELAP Certification Number: E-10116
Louisiana Certification Number: 03055
Oklahoma Certification Number: 9205/9935
Utah Certification Number: 9135995665

Enclosures

cc: Nadine Appenbrink, Larsen & Associates, Inc.

Pace Analytical Services, Inc.
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Lenexa, KS 66219
(913)599-5665

SAMPLE SUMMARY

Project: Hilton
Pace Project No.: 6025617

Lab ID	Sample ID	Matrix	Date Collected	Date Received
6025617001	HLPW-W-23832	Water	07/10/07 00:00	07/12/07 13:00

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SAMPLE ANALYTE COUNT

Project: Hilton
Pace Project No.: 6025617

Lab ID	Sample ID	Method	Analytes Reported
6025617001	HLPW-W-23832	EPA 353.2	1

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ANALYTICAL RESULTS

Project: Hilton
Pace Project No.: 6025617

Sample: HLPW-W-23832 Lab ID: 6025617001 Collected: 07/10/07 00:00 Received: 07/12/07 13:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2							
Nitrogen, NO2 plus NO3	1.0	mg/L	0.10	1		07/20/07 12:16		

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August 07, 2007

Lisa Larsen
Larsen & Associates, Inc.
1311 E. 25th St.
Suite B
Lawrence, KS 66046

RE: Project: Hilton
Pace Project No.: 6026684

Dear Lisa Larsen:
Enclosed are the analytical results for sample(s) received by the laboratory on August 03, 2007. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Trudy Gipson

trudy.gipson@pacelabs.com
Project Manager

A2LA Certification Number: 2456.01
Arkansas Certification Number: 05-008-0
Illinois Certification Number: 001191
Iowa Certification Number: 118
Kansas/NELAP Certification Number: E-10116
Louisiana Certification Number: 03055
Oklahoma Certification Number: 9205/9935
Utah Certification Number: 9135995665

Enclosures

cc: Nadine Appenbrink, Larsen & Associates, Inc.

Pace Analytical Services, Inc.
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(913)599-5665

SAMPLE SUMMARY

Project: Hilton
Pace Project No.: 6026684

Lab ID	Sample ID	Matrix	Date Collected	Date Received
6026684001	HILTON	Water	08/01/07 16:00	08/03/07 15:00

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SAMPLE ANALYTE COUNT

Project: Hilton
Pace Project No.: 6026684

Lab ID	Sample ID	Method	Analytes Reported
6026684001	HILTON	EPA 504.1	1

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ANALYTICAL RESULTS

Project: Hilton
Pace Project No.: 6026684

Sample: HILTON | Lab ID: 6026684001 | Collected: 08/01/07 16:00 | Received: 08/03/07 15:00 | Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
504 GCS EDB and DBCP	Analytical Method: EPA 504.1		Preparation Method: EPA 504.1					
1,2-Dibromoethane (EDB)	ND	ug/L	0.028	1	08/06/07 00:00	08/07/07 08:20	106-93-4	

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